OCTOBER, 1957

modern castings

the foundrymen's own magazine

What is "Marketing"

R. C. Meloy explains marketing as a four-step plan which will help the foundryman sell his castings

Weighing Molten Metal

Metal tapped from furnace can be weighed with speed and accuracy by using an electrical system

Carbon Refractories

Cupola refractory maintenance may be reduced by using carbon bricks and blocks in cupola construction

Foundryman in the Ring

The third man in the ring during many championship prize fights is a foundryman enjoying his hobby

Jet Age Castings

Photo story takes you down the precision castings production line at Misco Precision Castings Co.

Sealed Core Boxes

Longer core box life and safer operations result when boxes are sealed as described in this month's special Bonus Section.

future meetings and exhibits

OCTOBER

2-3 . . AFS *Michigan Regional Foundry Conference*. Michigan State University, Kellogg Center, East Lansing, Mich.

3-4 . . Refractories Institute, *Fall Meeting*. Grand Hotel, Point Clear, Ala.

9-11 . . Gray Iron Founders' Society, *Annual Meeting*. Drake Hotel, Chicago.

12-13 . . Conveyor Equipment Manufacturers' Association, *Annual Meeting*. Grand Hotel, Point Clear, Ala.

17-18 . . Magnesium Association, *Annual Convention*. The Biltmore, New York.

17-19 . . Foundry Equipment Manufacturers' Association, *Annual Meeting*. The Greenbrier, White Sulphur Springs, W. Va.

18-19 . . AFS *17th New England Regional Foundry Conference*. Massachusetts Institute of Technology, Cambridge, Mass.

18-19 . . AFS *8th Annual Northwest Regional Foundry Conference*. Hotel Vancouver, Vancouver, B.C.

21-25 . . National Safety Council . . *45th National Safety Congress and Exposition*. Conrad Hilton Hotel, Chicago.

22 . . American Society of Safety Engineers, *Annual Meeting*. Conrad Hilton Hotel, Chicago.

24-25 . . AFS *Niagara Frontier Regional Foundry Conference*. Statler Hotel, Buffalo, N. Y.

25 . . Malleable Founders' Society, *Western Section Meeting*. Drake Hotel, Chicago.

25-26 . . National Management Association, *Annual Meeting*. Penn-Sheraton Hotel, Pittsburgh, Pa.

28-31 . . Atomic Industrial Forum, *Atom Fair*. Coliseum, New York.

31-Nov. 2 . . National Metal Trades Association, *Convention*. Conrad Hilton Hotel, Chicago.

31-Nov. 1 . . *10th Annual Purdue Metals Casting Conference*. Purdue University, Lafayette, Ind.

NOVEMBER

2-10 . . *International Congress & Exhibition of Measuring Instrumentation and Automation*. Dusseldorf, Germany.

3-8 . . American Society for Metals and Society for Nondestructive Testing . . *2d World Metallurgical Congress* & *39th Annual National Metal Congress*. Morrison Hotel, Chicago.

7-8 . . National Foundry Association, *Annual Meeting*. Waldorf-Astoria Hotel. New York.

11-13 . . Steel Founders' Society of America, *12th Technical and Operating Conference*. Carter Hotel, Cleveland.

19-21 . . Investment Casting Institute, *Annual Fall Meeting*. Sheraton Hotel, Chicago.

DECEMBER

3-4 . . Foundry Facings Manufacturers' Association, *Annual Meeting*. Hotel Waldorf-Astoria, New York.

4-6 . . American Institute of Mining, Metallurgical and Petroleum Engineers, *Electric Furnace Steel Conference*. Penn-Sheraton Hotel, Pittsburgh, Pa.

5-7 . . National Association of Manufacturers, *Annual Meeting*. Waldorf-Astoria Hotel, New York.

1958

JANUARY

17 . . Malleable Founders' Society, *Semi-annual Meeting*. Hotel Cleveland, Cleveland.

30-31 . . *College-Industry Conference*. University of Michigan, Ann Arbor, Mich.

FEBRUARY

13-14 . . AFS *Wisconsin Regional Foundry Conference*. Hotel Schroeder, Milwaukee.

16-20 . . American Institute of Mining, Metallurgical & Petroleum Engineers, *Annual Meeting*. Hotels Statler and Sheraton-McAlpin, New York.

20-21 . . AFS *26th Annual Southeastern Regional Foundry Conference*. Patten Hotel, Chattanooga, Tenn.

MARCH

12-13 . . Foundry Educational Foundation, *College-Industry Conference*. Hotel Cleveland, Cleveland.

17-18 . . Steel Founders' Society of America, *Annual Meeting*. Drake Hotel, Chicago.

APRIL

13-18 . . American Chemical Society, *Spring Meeting*. San Francisco.

MAY

19-23 . . American Foundrymen's Society, *62d Annual Castings Congress & Foundry Show*. Public Auditorium, Cleveland.

India Will Hold Symposium on Foundry Problems

Emphasis on establishing a heavy foundry industry in India is one of the key points of the second Five Year plan announced by the Indian government.

To focus attention on this phase of the program, a symposium will be held February 5-8 dealing with "Recent Developments in Foundry Technology." The symposium will be spon-

Site of Indian symposium

sored by the Indian Institute of Foundrymen and the National Metallurgical Laboratory.

Indian and foreign authors have been invited to participate. Subjects to be covered will include basic materials and methods, modern developments, foundry mechanization and layout, foundry management, and the position of the Indian foundry industry in the Five Year plan.

For further details about the program circle **No. 4, Reader Service Card, page 7-8.**

F.E.M.A. Meets in October

The 39th annual meeting of Foundry Equipment Manufacturers Association will be held at the Greenbrier Hotel, White Sulphur Springs, W. Va., October 17-19.

Frank W. Shipley, Caterpillar Tractor Co., Peoria, Ill., and former president of the American Foundrymen's Society will discuss *"What the Foundry Industry Expects of Equipment Manufacturers."*

Meetings the first day will center on topics of interest to the various product groups of the association. The F.E.M.A. statistical program will be analyzed and a panel discussion will deal with *"Marketing of Foundry Equipment"* during the three-day program.

Other activities will include the election of a president, vice-president, three directors, and an executive secretary.

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october, 1957
vol. 32, no. 4

modern castings

in this issue

COVER PHOTO: Triplex electric melting of cast iron in the FIAT foundry in Turin, Italy.

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AUDITED PAID CIRCULATION ABC

On The Management Side

■ **Profit-Sharing.** A large and growing movement toward profit sharing by management and labor is becoming evident. More than 15,000 firms now have profit-sharing plans that involve over 5.5 million American workers. During the first quarter of 1957, the Internal Revenue Service approved 746 new profit-sharing plans.

The foundry industry has not remained aloof from this trend. Besides the fact that a number of foundries have profit-sharing plans it is interesting to note that the national chairman of the Council of Profit Sharing Industries is Rawson L. Wood, president of Arwood Precision Casting Corp. This organization has over 800 members who are convinced profit sharing pays its own way and then some.

In one foundry plan the employees get basic wages 12 per cent higher than average for the industry, plus 50 per cent of the remaining profit after a 5-½ per cent return on investment has been set aside for stockholders. This year the employees' share of profits equals 46 extra days' pay.

Two types of profit-sharing plans prevail – immediate distribution and deferred distribution. Under deferred distribution, the funds are credited to the employees' accounts as earned, but actual distribution is postponed until some time in the future. Immediate distribution plans provide payments to participants at set intervals – either yearly or more frequently.

Some plans are designed to reward individual productivity while others may encourage long service or provide retirement income. Any plan must be a compromise that establishes a worth-while incentive to employees and still provide a fair return on the shareholder's investment.

If you desire more information on this subject, circle No. 6 on the Reader Service Card, page 7-8.

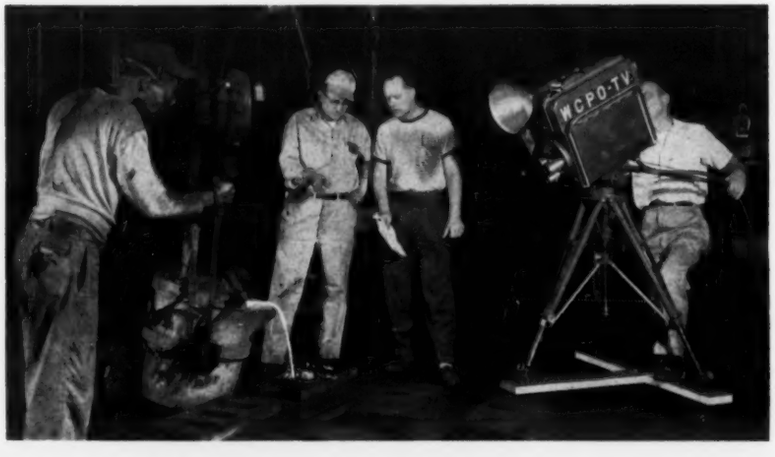
■ **Glamorgan Pipe & Foundry Company Honored.** As a donor in support of American Education, Glamorgan was awarded "a citation in recognition of a substantial and significant gift to education" by the publishers of "Who's Who in Commerce and Industry." The purpose of the Citations for Corporate Educational Philanthropy is to note outstanding examples of corporate giving to education and, by so doing, stimulate increased interest in this type of philanthropy on the part of American business.

Glamorgan Foundry, Lynchburg, Va., was one of ten American companies so honored. Several gifts, totalling $99,750, were made by Glamorgan to the Virginia Foundation for Independent Colleges and to local Virginia colleges. The awards committee was particularly impressed with this action on the part of Glamorgan Foundry because it is controlled by a company in France where education is almost exclusively in government hands. The committee stated "*The French directors of the corporation controlling Glamorgan have not only authorized the above gifts, they have accepted American philosophies of voluntary financial aid to education in a most inspiring manner.*"

modern castings album

AFS officers and directors assembled in Chicago during August for the annual meeting of the Society's Board of Directors. Seated, left to right: C. E. Drury, H. C. Erskine, C. C. Drake, R. W. Griswold, R. W. Trimble, Vice-President L. H. Durdin, President H. W. Dietert, Past President F. W. Shipley, A. V. Martens, A. A. Hochrein, H. G. Stenberg, F. J. Pfarr, J. R. Russo, H. Heaton, W. D. Dunn. Standing, left to right: G. R. Rusk, A. M. Slichter, AFS General Manager Wm. W. Maloney, K. L. Landgrebe, AFS Assistant Secretary A. B. Sinnett, AFS Technical Director S. C. Massari, C. W. Gilchrist, C. E. Nelson, A. J. Meyers.

Televised foundry tour was an unusual feature offered by Peerless Foundry Co., Cincinnati, at the 1st AFS Engineered Castings Show. Plant operations were shown four times daily on television sets in the Peerless booth. Tour guide was Harry Placke, upper picture, who wrote and narrated the tours. The lower picture shows how the foundry end of the show was handled. Camera is following a pouring operation on the squeezer floor while foreman Herman Wuebker, second from left, passes along some information to the TV director.



Buffalo Foundry of Allegheny Ludlum Steel Corp. has cast stainless steel in unusual shapes. Corkscrew above is a feed screw for a pulp mill. At the left is a 1701-lb valve disc. Casting was made in single piece with a core in the center of each side. Skin of the valve is ¾-in. thick.

Non-Ferrous Degassing Improves Metal Quality

by E. A. Lange / *Head Casting Section Metallurgy Division, U. S. Naval Research Laboratory, Washington, D. C.**

■ Non-ferrous castings of high integrity can be produced from conventionally melted metal if the molten metal is given a degassing treatment subsequent to melting operations to prevent the evolution of dissolved gasses during solidification.

Practices at the Naval Research Laboratories involve holding the molten metal for a period of 6 to 10 min in a chamber evacuated to a pressure of 0.5 to 0.3 mm Hg.

Machined surfaces of commercial type castings of pure copper, gun metal, monel, aluminum bronze, and aluminum alloys 195, 356, and 220 are of high quality and free of pits caused by gas evolution during solidification.

Mechanical Properties

The mechanical properties obtained in various sections of castings depends on the geometry of the casting, gating and risering practices as well as melt quality. For gun metal and aluminum alloys 195 and 356 vacuum degassing does not significantly improve tensile strength in sections where good directional solidification is established. However, tensile elongation may be improved as much as 100 per cent.

In sections of castings having intermediate directional solidification or slight feed metal deficiency vacuum degassing can decrease tensile strength and elongation.

In sections having low thermal gradients or feed metal deficiencies, vacuum degassing increases tensile strength and elongation.

Recent Experiments

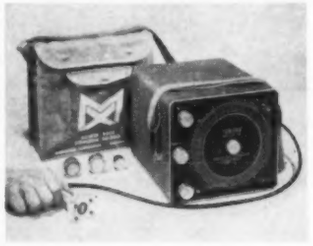
Recent experiments with improved vacuum degassing techniques incorporate inert gas purging and stirring of the molten metal at reduced pressures. Greatly improved properties have resulted for aluminum alloy 195-T6 cast in green sand molds without chills. Tensile properties of 50,000 psi ultimate strength, 35,500 psi yield strength, and 7.5 per cent elongation are obtained in test bars.

Tensile properties in excess of 80 per cent of the test bar values are obtained in castings without the use of chills. Consumption of inert gas is extremely low as only 40 cc is used for stirring a 70 lb heat during the holding period of six minutes.

* This article is based on a talk given by Mr. Lange at the Penn State Foundry Conference, June 21, 1957.

products and processes

Ultrasonic thickness measuring unit locates areas of corrosion or wear and gives direct thickness readings on castings. Measures with accuracy of



± 3 per cent on thickness between 0.027 and 4 in. *Magnaflux Corp.*

For Manufacturer's Information Circle No. 6, Page 7-8

Electric load cells which measure by elastic deflection, provide fast, remote indication or continuous reading of weight. May also be used for control of loading equipment or processes which feed materials handling equipment.

Also employed where measuring is affected by impact and vibration, fine abrasive dust, adverse ambient conditions, awkward structures or where equipment must be portable.

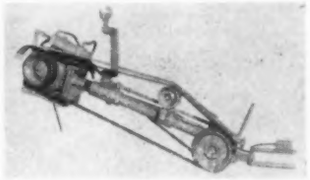
Foundry applicants include control of sand systems, (as illustrated) weighing charging buckets, and controlling molten metal tapping. *Leeds & Northrop Co.*

For Manufacturer's Information Circle No. 7, Page 7-8

Truck trailer, side dump, comes in 1½ and 2-cu yd capacities. Automatic coupler permits hauling in trains. *Palmer-Shile Co.*

For Manufacturer's Information Circle No. 8, Page 7-8

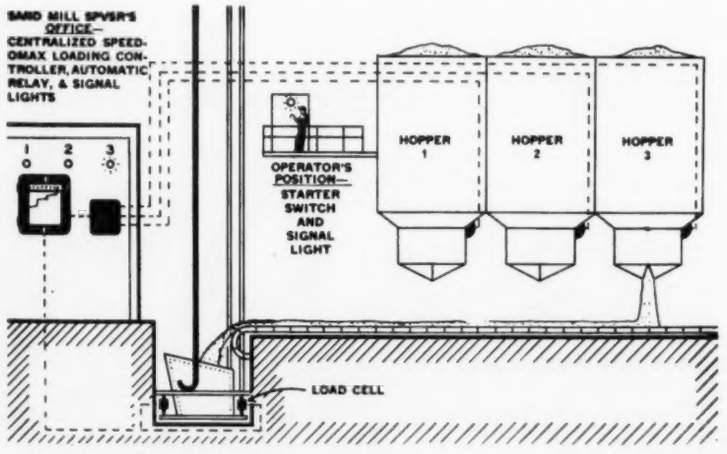
Abrasive belt swingframe grinders in two sizes come in wide range of power, belt widths and lengths for



heavy-duty applications. *Grinding & Polishing Machinery Corp.*

For Manufacturer's Information Circle No. 9, Page 7-8

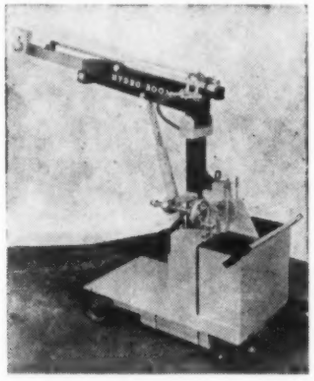
Plastic-steel repair kit, 80% steel, 20% plastic; hardens to metallic piece within two hours without heat or



pressure. Hardens in 1 min with use of heat. Kit contains glass tape. Tape and plastic-steel combination has compression strength over 50,000 psi and tensile strength over 45,000 psi. *Devcon Corp.*

For Manufacturer's Information Circle No. 10, Page 7-8

Hydraulic boom reaches 48 in. beyond truck, handles 1500 lb at maximum boom extension, 2500 lb with retracted boom. Available in hand-operated or battery-powered models,



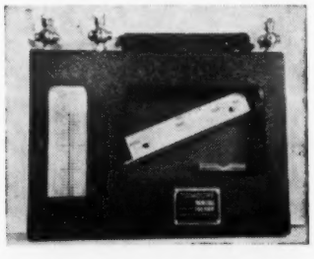
with or without propulsion. Width of 32 in. fits in narrow aisles. *Vanguard Engineering Co.*

For Manufacturer's Information Circle No. 11, Page 7-8

Metallic recuperator, designed to recover waste heat, is said to allow up to 80 per cent efficiency with flue gas temperatures as high as 1400 F. *Griscom-Russell-Schack Co.*

For Manufacturer's Information Circle No. 12, Page 7-8

Cupola blast meter and pressure gage indicates pressure and volume of air passing through tuyeres. Leads to more efficient melting and uniform control of blast volume. Gage may be



placed in any convenient location. Distance between gage and windbox is not important. *Trimount Instrument Co.*

For Manufacturer's Information Circle No. 13, Page 7-8

Magnetic belt conveyor transports ferrous loads up to 90 deg angles saving floor space. Loads, either unpackaged

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Please use card before April 1, 1958

or in paperboard containers, are carried on thin, rough-surface belt sliding over metal bed containing permanet magnets. *Alvey-Ferguson Co.*

For Manufacturer's Information Circle No. 14, Page 7-8

Corrosive liquids may be handled and stored in 55-gal steel drums by using polyethylene liners. Liners also fabri-

cated to specification. Roll lip on top edge avoids spillage of liquid between liner and container. *American Agile Corp.*

For Manufacturer's Information Circle No. 15, Page 7-8

Fluid transfer pump for 55-gal drums, air-powered, automatically stops and starts as operator releases trigger. Operates either in open head or 2-in.

bung opening. May be used for transferring, mixing, or measuring fluids used in foundry or pattern shop. *Gray Co.*

For Manufacturer's Information Circle No. 16, Page 7-8

Electronic weight system uses four 10,000 lb compression type load cells eliminating moving parts. Scale indicates visually and prints weights. Dial is located 50 ft from weighing platform. Operation depends on distortion of wire, creating change in re-

sistance which unbalances the bridge circuit. Variation in voltage output is interpreted on dial indicator of scale mechanism. *Baldwin-Lima-Hamilton Corp.*

For Manufacturer's Information Circle No. 17, Page 7-8

Vacuum melting furnace for metals requiring controlled atmosphere melting, produces evaluation buttons by consumable electrode arc melting of

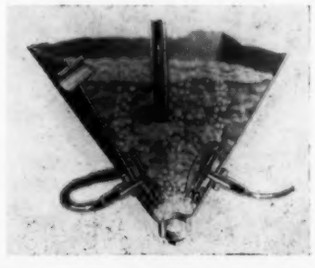
sponge or shavings. Produces sample ingots from 2 to 6 in. diameters and 16 in. long. Vacuum pump is capable of 0.2 micron vacuum. Furnace can be back filled with helium or argon. *Oregon Metallurgical Corp.*

For Manufacturer's Information Circle No. 18, Page 7-8

Asbestos papers, unaffected by temperatures to 400 F, have good corrosion resistance. May be used for thermal insulation, gasketing, and fire barriers. Available in tapes, rolls, and sheets. *Johns-Manville.*

For Manufacturer's Information Circle No. 19, Page 7-8

Abrasive slurry agitator prevents solid packing of abrasive at tank bottom after over-night shutdown. Eliminates



need for mechanical pump and auxiliary equipment. Can be adapted to conical-bottom tanks. Requires only take-off from 80-90 lb compressed air

line to operate nozzle and needle valve to regulate air flow. Agitating air sweeps tank bottom and spirals through liquid to give rapid agitation of slurry. *Pangborn Corp.*

For Manufacturer's Information Circle No. 20, Page 7-8

Print holder handles drawings and blueprints up to 36 in. wide and 40 ft long in horizontal or vertical position.

Displays area 36 in. square. *Aqua Sportsman, Inc.*

For Manufacturer's Information Circle No. 21, Page 7-8

Spray gun for applying graphite on ladles after they have been heat-set gives ceramic bond with better surface coverage than brush. Spraying thick slurry of mortar over patches cuts down cracks in melting zone of cupolas and prevents patches from falling from fire-brick wall. Drawings supplied for shop-made gun. *Mexico Refractories Co.*

For Manufacturer's Information Circle No. 22, Page 7-8

Appraisor circular slide rule eliminates mathematical formulae in analyzing new equipment proposals. Use to de-

termine worthwhile investments and if new equipment will pay for itself. *Van D. Mark.*

For Manufacturer's Information Circle No. 23, Page 7-8

Nodular iron produced with lance injector which adds small amounts of powered magnesium to melt through nitrogen stream. Lance is said to elim-

Circle No. 127, Page 7-8

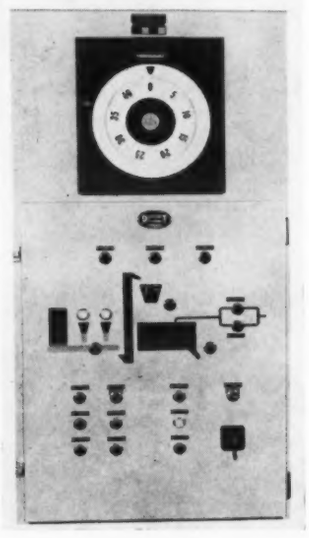
inate previous problems of introducing magnesium and to make possible extremely low-sulphur iron from a poor-quality, cheap charge. *Engineering Imports.*

For Manufacturer's Information Circle No. 24, Page 7-8

Bag cutter for paper sacks of granular substances such as refractories and cements, uses hardened steel blade. Height is adjustable. *Ridley & Co.*

For Manufacturer's Information Circle No. 25, Page 7-8

Automatic sand tempering unit and cycling system automatically adds proper amount of water to each batch of molding sand and cycles each stage of the mixing operation. Three-way operation—automatic, semi-automatic, and manual. Unit is flexible; batch



sizes may be varied 25 per cent; desired moisture content may be changed at any time; variable sequence and operating time may be altered.

System achieves high degree of accuracy by continuous moisture measurement during the mixing cycle. Technical training is not necessary. Graphic panel permits operator to follow sequence. *Harry W. Dietert Co.*

For Manufacturer's Information Circle No. 26, Page 7-8

Coated abrasives, on belts and wheels, give one-step smoothing and finishing to electric frying pan castings. The permanent mold cast pans, are finished on the inside and pass a series of polishing heads equipped with abrasive belts, polishing-grinding wheels and color buffs. The coated abrasive wheels take the shape of the pan and cover the entire side.

The wheels are made of hundreds of pieces of cloth-backed abrasive. As

the backing and abrasive material wears away, the wheels can be preformed or take the shape of the piece of work. Wheels last an average of 7500 castings, reducing by one-third the number of polishing heads required for belts. *Minnesota Mining & Mfg. Co.*

For Manufacturer's Information Circle No. 27, Page 7-8

Hardfacing welding technique uses tubular wire electrodes on open arc semi-automatic machine for faster application. Metal said to be deposited 200 per cent faster than manually with improved quality and uniformity. Circular tubes hold flux and hardfacing alloy. Electrode is steadily maintained at length of two or three inches from nozzle end. *Amsco Div., American Brake Shoe Co.*

For Manufacturer's Information Circle No. 28, Page 7-8

Electric fork lift truck, available in 1000-3000 lb capacities, is 60 in. long with 52 in. turning radius. Has four forward speeds up to 6 mph. Powered by 24-volt batteries. *Hustler Corp.*

For Manufacturer's Information Circle No. 29, Page 7-8

Practical sessions of instruction in the uses and limitations of epoxy tooling resins for pattern applications are being offered by a mid-western epoxy resin formulator. Low-cost handling techniques are taught to patternmakers in attendance. No charge is made for instructions; the only charge is for materials used. *Tylene Plastics, Inc.*

For Manufacturer's Information Circle No. 30, Page 7-8

Flameplating, the blasting of tungsten carbide or aluminum oxide particles onto a metal surface, is being used on hot air valves in jet planes. Particles are suspended in an oxy-acetylene mixture which is ignited. Detonation waves travelling at 10 times the speed of sound carry particles through a gun barrel.

Gases approaching 6000 F heat particles to plasticity and embed them in the metal. By successive detonations, coatings of 0.002 to 0.10 in. can be built up. *Linde Co. Div., Union Carbide Corp.*

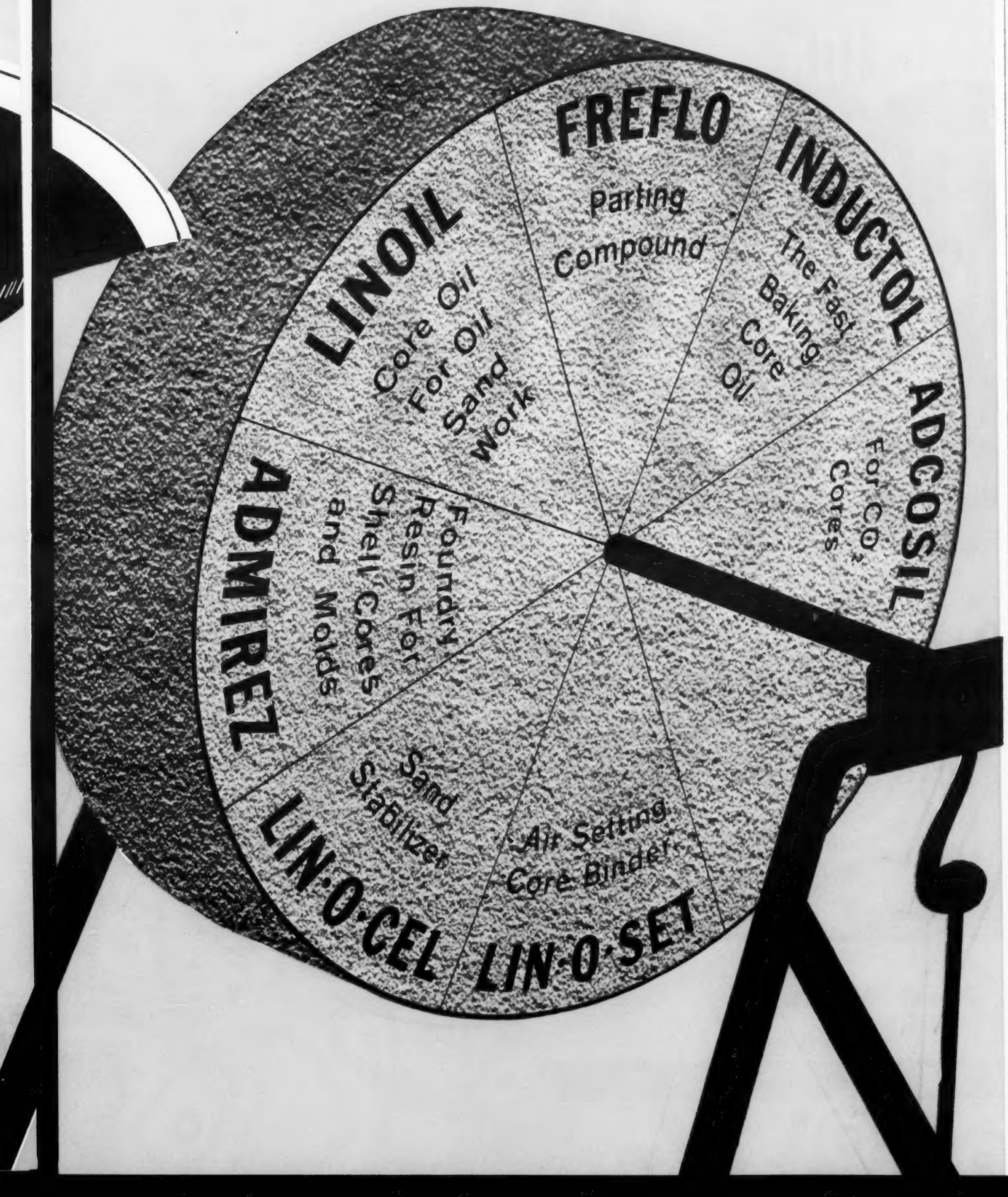
For Manufacturer's Information Circle No. 31, Page 7-8

Translucent plastic fabric keeps working areas free of dust and contaminating fumes but allows penetration of light. Material is waterproof, fire resistant, rot, and mildew proof. *Herculite Protective Fabrics.*

For Manufacturer's Information Circle No. 32, Page 7-8

Masonry cutting saw features constantly level cutting head and blade

Circle No. 129, Page 7-8



pressure equalizer. One simple operation positions blade for any height. Uses 2-hp enclosed motor. *Eveready Briksaw Co.*

For Manufacturer's Information Circle No. 33, Page 7-8

Hydraulic cylinder uses heat and fluid resisting teflon plastic seals, withstands temperatures up to 500 F. Foundry applications include use in cylinder-actuated operations on shell molding and furnace equipment. Unit interchangeable with ordinary gasket low-pressure cylinders.

Placement of air bleeds allows remote bleeding of hard-to-reach installations. Design of new piston rod bushing seal allows use of plastic seals instead of synthetic rubber. Bores of 1-½, 2 and 3-¼ in. have normal shock operating ratings of 1500 psi, non-shock operating ratings of 2500 psi. *Flick-Reedy Corp.*

For Manufacturer's Information Circle No. 34, Page 7-8

Wetting agents, through faster action, provide effective means of reducing dust in foundry shakeout and sand handling systems. Normal water when put on a dusty surface forms droplets, wet water soaks the dust and entire surface. *Aquadyne Corp.*

For Manufacturer's Information Circle No. 35, Page 7-8

Carbon determinator provides rapid quantitative determination within two min after sample is prepared and weighed. Sample may be borings, mill chips, crushed samples, pellets, shot or cast pencils from a specimen mold. Used for metals, organic, and inorganic materials. *Harry W. Dietert Co.*

For Manufacturer's Information Circle No. 36, Page 7-8

Pocket-sized respirator made of corrosion resistant materials, features low-resistance inhalation valve for ease of air intake but protects filter from exhaled air and moisture. Mouthpiece is easily replaceable. Cartridge is prevented from touching or pressing against chin. *American Optical Co.*

For Manufacturer's Information Circle No. 37, Page 7-8

Impact hammer, air-operated, can stake, swage, stamp, cut, mark, and punch. Unit has 2-in. stroke, clearance in ram height from base of 5 in., and 10-in. throat. May be set up for multi-stage operation on 2-¼ in. centers. *High Speed Hammer Co.*

For Manufacturer's Information Circle No. 38, Page 7-8

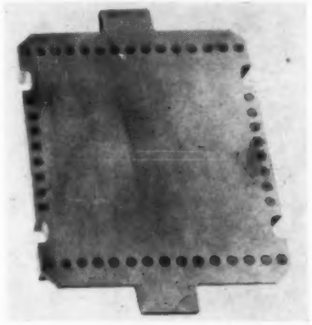
Plastic-graphite firebrick resists erosion, spalling, and cracking. Used for repatching and relining ladles, spouts

Circle No. 129, Page 7-8

cupolas, and runners. Available in premixed or dry form. Any thickness can be applied in monolithic ladle lining or patching to duplicate original lining. *Denver Fire Clay Co.*

For Manufacturer's Information Circle No. 39, Page 7-8

Cope and drag pattern plates available in cast aluminum or iron. Steel inserts, optional in aluminum for wear



resistance, are cast-in along flask line. Applicable for jolt stripper or jolt rollover machines. *Kindt-Collins Co.*

For Manufacturer's Information Circle No. 40, Page 7-8

Sand aerator fits anywhere in sand system. Does not require elevator feed. Largest unit has 450 ton per

hour capacity. Conveyor belt carries material through unit. Under-carriage and discharge baffling eliminates spillage. *Pekay Machine & Engineering Co.*

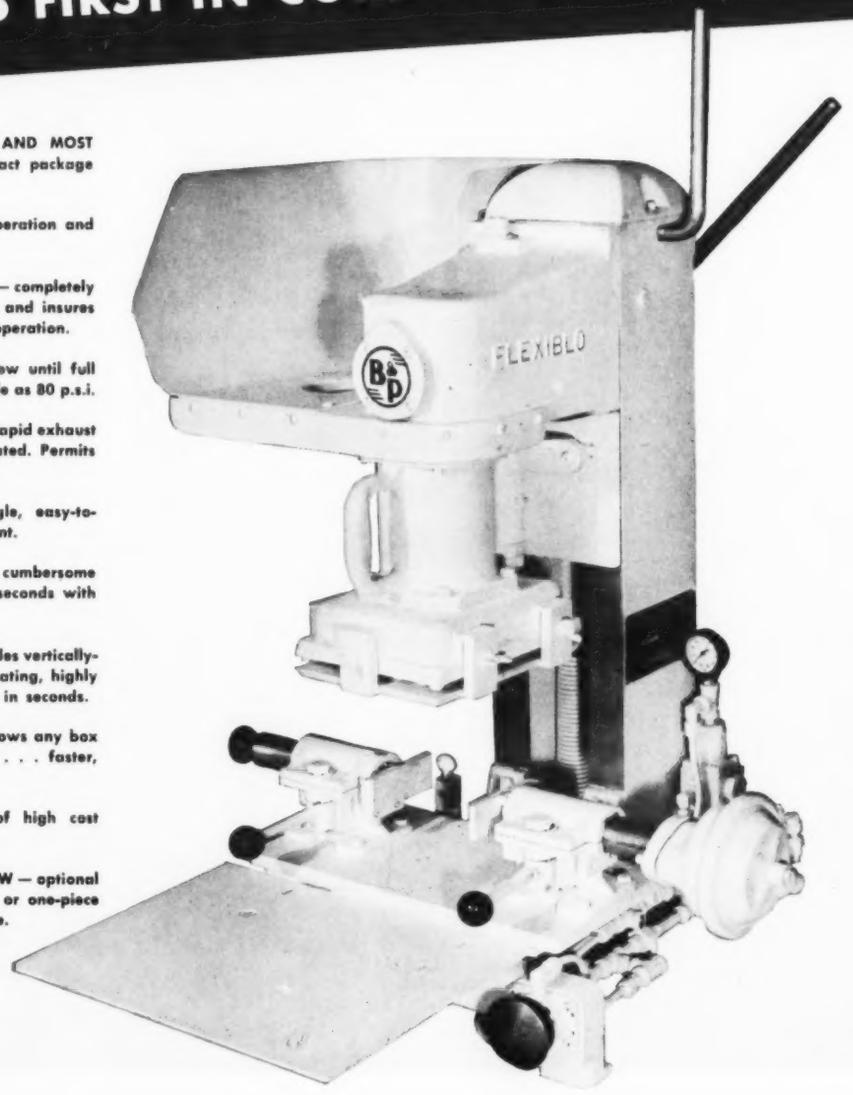
For Manufacturer's Information Circle No. 41, Page 7-8

Bi-metallic casting permits molecular bonding of light metals to special prepared surface of ferrous metals. Combines physical properties of both metals in solving problems of heat transfer, joining, bearing surfaces, weight saving, cost reduction or oxidation resistance. Process requires only one additional operation and no special

Circle No. 131, Page 7-8

A DOZEN REASONS WHY THE CB5C FLEXIBLO IS FIRST IN CORE BLOWER SALES

1. **IT'S FASTEST, EASIEST TO OPERATE AND MOST FLEXIBLE**—and best of all it's a compact package and ready to operate on delivery.
2. **LOWEST COST** — lowest installation, operation and maintenance cost.
3. **NEW SINGLE PUSH-BUTTON CONTROL** — completely eliminates error or possibility of error and insures minimum air consumption and fastest operation.
4. **NEW SEQUENCE VALVE** — prevents blow until full line pressure is on — operates on as little as 80 p.s.i.
5. **NEW BLOW VALVE** — faster blow with rapid exhaust through magazine to keep sand agitated. Permits handling stronger sands.
6. **INSTANT HEIGHT ADJUSTMENT** — single, easy-to-operate, quick-locking height adjustment.
7. **QUICK-CHANGE BLOW PLATE** — no cumbersome adjustments, blow plates changed in seconds with hand-turned thumb screws.
8. **NEW DIAPHRAGM CLAMP UNIT** — handles vertically-split core boxes. A precise, quick-operating, highly efficient clamping unit . . . removable in seconds.
9. **WOODEN OR METAL CORE BOXES**– blows any box that can be blown on any machine . . . faster, harder and with less wear.
10. **LOW COST BLOW PLATES**– instead of high cost bulky cartridges.
11. **FULL TWO-INCH OR FOUR-INCH DRAW** — optional for handling horizontally split boxes, or one-piece boxes attached to the blower magazine.
12. **STAND OR BENCH OPERATION** — an individual stand is available as optional equipment.

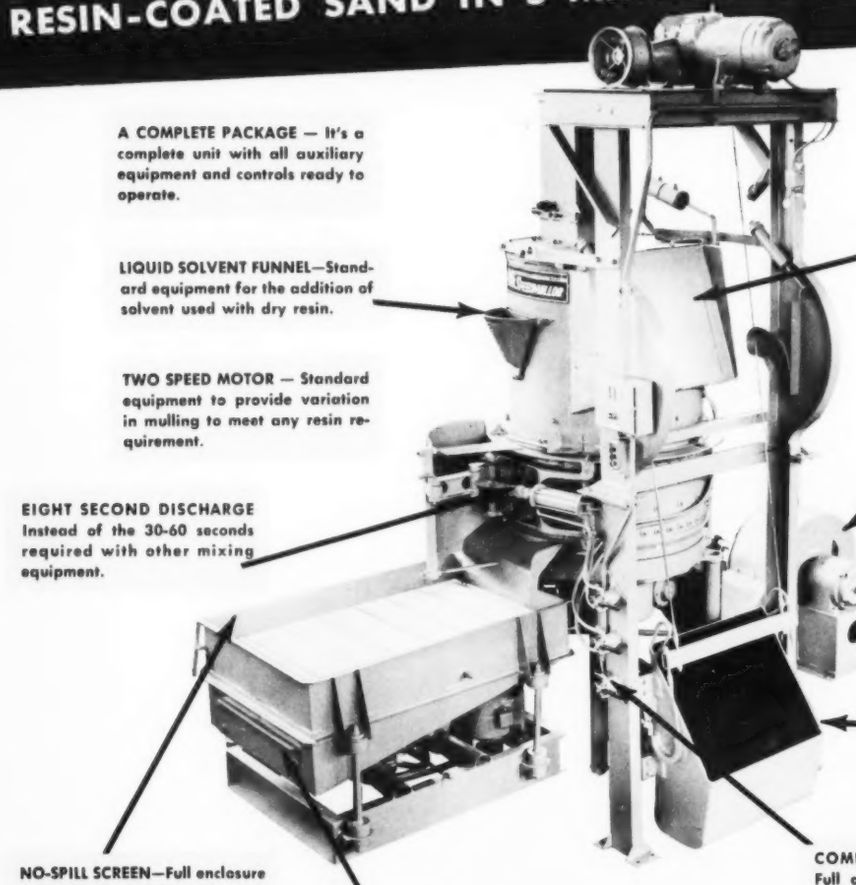


One of the new Flexiblos...guaranteed to blow any core box, wood or metal, that can be blown on any machine and to blow it faster, harder and with less wear on core box face or joint and cavity

Write for information: Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Avenue, Chicago 39, Illinois

Now...a free, no-obligation demonstration can be made in your own core room at your request...write today!

COLD PROCESS, FREE-FLOWING, NON-CLUMPING, RESIN-COATED SAND IN 5 MINUTES INSTEAD OF 25



A COMPLETE PACKAGE — It's a complete unit with all auxiliary equipment and controls ready to operate.

LIQUID SOLVENT FUNNEL—Standard equipment for the addition of solvent used with dry resin.

TWO SPEED MOTOR — Standard equipment to provide variation in mulling to meet any resin requirement.

EIGHT SECOND DISCHARGE Instead of the 30-60 seconds required with other mixing equipment.

NO-SPILL SCREEN—Full enclosure design prevents spillage—insures uniform screening.

FULL FLEXIBILITY —— Discharges perfectly coated, free-flowing, non-clumping sand into air conveying system or onto conveyor.

FULL SEALING FLOP GATE — Full perimeter seal around flop gate opening eliminates dust, provides most effective operation.

VARIABLE VOLUME BLOWER — Solvent drying equipment actually injects air through the mass at a controlled rate for most efficient solvent evaporation. Air volume is infinitely variable from zero to maximum.

SPECIAL SKIP BUCKET — Special wide design with low loading height insures fast easy loading.

COMPLETE WITH CONTROLS Full air controls are supplied as standard equipment. Mulltrolmatic automatic controls — to control every phase of the operation — are available as optional equipment.

NEW CP SHELL SPEEDMULLOR SLASHES COSTS FOR SHELL MOLDERS

Now, free-flowing, non-clumping, resin-coated shell molding sands may be prepared by the cold process in the new Model CP Shell Speedmullors in one-fifth the time required with other mixing equipment. Available in six sizes with capacities of from 2,000 to 9,000 pounds per hour, these new Shell Speedmullors operate on total cycle times of approximately five minutes on all typical resin-coated sand mixtures. These units are available as complete packages with all auxiliary equipment and controls ready to do the whole job on installation.

For the first time the operator has full control over all of the variables of cold process preparation. Three position mullor wheel spacing and two speed mullor motor provide a wide range of variation of mulling pressure.

In addition, the volume of air blown *through* the sand mass (only the Shell Speedmullor provides this feature) may be varied from zero to maximum to meet requirements. These new units handle either liquid resin additions or solvent and dry resin additions. Mulltrolmatic — the ultimate of automatic control — is available to control every phase of the operation.

For full information and prices write directly to *BEARDSLEY & PIPER, Division Pettibone Mulliken Corporation, 2424 North Cicero Avenue, Chicago 39, Illinois.*

equipment beyond that normally found in light metals foundry. *Al-Fin Division Fairchild Engine & Airplane Corp.*

For Manufacturer's Information Circle No. 42, Page 7-8

High-speed moisture analyzer, operating on principle of nuclear magnetic resonance, makes quantitative determinations of moisture content on wide variety of solids including clay. Analysis made in 30 sec to 4 min. Uses 40 cc sample size. *Schlumberger Well Surveying Corp.*

For Manufacturer's Information Circle No. 43, Page 7-8

Inspection equipment made of magnesium and aluminum weighs ¼-to-⅖ that of steel equipment. Low weight speeds inspection. Equipment includes angle plates, height blocks, pattern-making and tooling angles, and straight and parallel edges. *Challenge Machinery Co.*

For Manufacturer's Information Circle No. 44, Page 7-8

Cope and drag sealer, extruded in permanently plastic bead form is self-dissipating permitting re-use of sand. High moldability eliminates runouts; compressibility gives gasket-like seal. *Presstite-Keystone Engineering Products Co. Div., American Marietta Co.*

For Manufacturer's Information Circle No. 45, Page 7-8

Moving kit for handling loads up to 3 tons include four roller dollies each with load capacity of 1500 lb. Dollies distribute weight on three heavy-duty rolling cylinders, may be turned 180 deg. and used in tandem. *Stokvis-Edera & Co.*

For Manufacturer's Information Circle No. 46, Page 7-8

Die casting machine handles up to 4-lb shot. Features 150 ton locking pressure, automatic cycling at 500 shots per hour, 20 x 21 in. die platens, 8-in. die stroke, and blast-type furnace blower. One model for zinc, tin, or lead; cold chamber type for aluminum, brass, and magnesium. *American Die Casting Machinery Co.*

For Manufacturer's Information Circle No. 47, Page 7-8

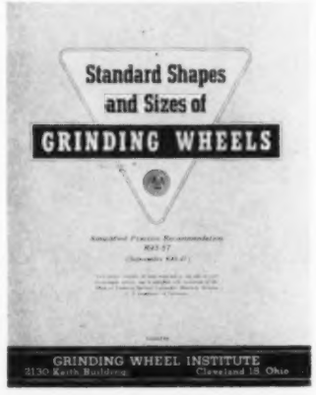
Portable x-ray equipment for radiographic inspection of castings and assemblies comes in three KVP ranges, 55-200, 70-260, and 70-300. All have built-in high tension transformers, simplified color-coded technique charts, and protective devices for overloads, high voltage, excessive voltage, and excessive oil temperature. Maximum steel penetration ranges from 2-¾ to 4-¼ in. *Mitchell Radiation Products Corp.*

For Manufacturer's Information Circle No. 48, Page 7-8

Circle No. 131, Page 7-8

for the asking

Grinding wheel practice recommendations, 76 pp, supersedes 1947 edition. Arranged in two parts, Use Classification and Standard Shape Types and Sizes. *Grinding Wheel Institute.*
Circle No. 61, Page 7-8



Aluminum alloy brochure, in new handy file folder style, gives chemical composition, typical properties, government specifications, and applications for alloy 417. *Apex Smelting Co.*
Circle No. 62, Page 7-8

Risering castings—reprint of an AFS exchange paper concerning steel, but principles may be applied to other metals. *Nassau Smelting & Refng. Co.*
Circle No. 63, Page 7-8

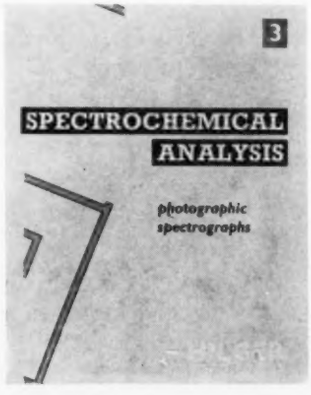
Shell mold casting booklet, 8 pp, presents a photostory of procedure; also features quality control, design considerations, materials, and typical castings. *Westinghouse Electric Corp.*
Circle No. 64, Page 7-8

Metals and alloys catalog, 22 pp, covers various grades of chromium, chromium moybdenum, ferro alloys, tungsten melting base alloy, zirconium aluminum, and vanadium aluminum. Also includes experimental alloys available in laboratory and pilot plant quantities. Chemical analysis and powder mesh sizes for each alloy listed. *Shieldalloy Corp.*
Circle No. 65, Page 7-8

Material lifting catalog, 6 pp, summarizes hydraulically-powered line including loading dock ramp, platform lifts, feed tables, factory truck maintenance lifts, skid inverters, cross-over-bridge and high capacity lifting devices. *Joyce-Cridland Co.*
Circle No. 66, Page 7-8

Ductile iron, 16 publications, covering specifications, applications and characteristics. *International Nickel Co.*
Circle No. 67, Page 7-8

Spectrographic analysis catalog, 24 pp, describes variety of prism and grating spectrographs and related accessories. Included is design data, application, and characteristic of each type instrument; plus specification tables and graphs permitting quick comparison of individual performance ranges. *Jarrell-Ash Co.*
Circle No. 68, Page 7-8



Wood flour benefits in sand mixtures are detailed in booklet describing re-

sults of adding cellulose materials to typical synthetic molding sand; also sections on confined expansion, hot strength, and cleaning action. *Eastern Clay Products Dept., International Minerals & Chemical Corp.*
Circle No. 69, Page 7-8

Tooling plastics bulletin outlines uses, materials, and physical properties. Deals with laminating resins used in combination with glass cloth for production of laminates. *Houghton Laboratories, Inc.*
Circle No. 70, Page 7-8

Barrel burnishing compound data sheet, 2 pp, gives application hints for developing color and luster on brass, copper, and mild or hardened steel parts. *Oakite Products, Inc.*
Circle No. 71, Page 7-8

Safety equipment catalog lists products by functions, each with general specifications and recommended uses. *General Scientific Equipment Co.*
Circle No. 72, Page 7-8

Nickel-chromium resistance wire and ribbon for heating elements in industrial heating equipment are described in 20-pp catalog. Discusses metallurgical factors, physical properties, resistance tolerances, and furnace element design. *Hoskins Mfg. Co.*
Circle No. 73, Page 7-8

Car shaker bulletin, 6 pp, describes use in unloading granular materials from open hopper-bottom gondola cars. Unit has lift bars designed for easy centering on car eaves and for attaching hooks or shackles when hoisting. *Allis-Chalmers Mfg. Co.*
Circle No. 74, Page 7-8

Transmission products and uses in elevating and conveying machinery is described in 88-p catalog. Includes shaft collars, couplings, clutches, pillow blocks, take-ups, wheel hubs, gears, holdbacks, chains and sprocket wheels. *Jeffrey Mfg. Co.*
Circle No. 75, Page 7-8

Hinged-steel conveyor belting bulletin, 6 pp, describes complete line. Five standard forms shown with diagrams and charted specifications. Belting withstands extreme wear caused by metal scrap, castings, turnings, and other abrasive materials. *May-Fran Engineering, Inc.*
Circle No. 76, Page 7-8

Oil burning manual, 4 pp, gives data, formulae, and general information leading to improved performance and efficiency of oil burners. Potential de-

ficiencies, their significance and remedy are included. *Cleveland Fuel Equipment Co.*
Circle No. 77, Page 7-8

Bucket and hopper bulletin, 4 pp, includes side-dump and bottom-dump models. Also contains weights of various materials handled in foundry. *Penn Iron Works, Inc.*
Circle No. 78, Page 7-8

Bibliography of information about aluminum for designers in the metalworking field; includes literature and motion pictures. *Aluminum Co. of America.*
Circle No. 79, Page 7-8

How to braze stainless steel is described in 8-p technical reprint. Covers filler materials, cleanliness, clearances, wetting, fixtures, distortion, heating, cooling and atmosphere protection. *General Electric Co.*
Circle No. 80, Page 7-8

Pressure and exothermic feeding of iron castings and other foundry processes are treated briefly in 8-p technical manual. *Foundry Services, Inc.*
Circle No. 81, Page 7-8

Identification code for diamond wheel shapes explains system made up of basic core shape, shape of diamond cross-section, location of diamond section, and modifications. Approved by American Standards Association. *Grinding Wheel Institute.*
Circle No. 82, Page 7-8

Pneumatic conveyor catalog, 8 pp, includes layouts for manual and automatic operation and photos of equipment in use. Transports dry pulverized and fine granular materials. *Brady Conveyors Corp.*
Circle No. 83, Page 7-8

Shell molding, how it was adopted by a small gray iron foundry, is told in news story form. *Durez Plastics Div., Hooker Electrochemical Co.*
Circle No. 84, Page 7-8

Self-dumping hoppers for moving wet or dry, cold or hot materials, are illustrated in catalog. Literature describes five models with capacities from ½- to 2 yds. *Apex Welding & Fabricating Corp.*
Circle No. 85, Page 7-8

Dust collector bulletin, 16 pp, describes dynamic precipitator. Also contains wiring diagrams, 23 performance tables, engineering data, pipe resistance chart, tables for normal water supply rates, dimensions for sludge

settling tanks and humidifying efficiency graphs. *American Air Filter Co.*
Circle No. 86, Page 7-8

Foundry alloy catalog gives chemical content and brief description of uses for ferrochromium, ferrosilicon, ferrovanadium and special alloys. *Vanadium Corp. of America.*
Circle No. 87, Page 7-8

Sand booklet illustrates steps in obtaining and processing sand; lists 24 grades ranging from 25 gfn to 400 mesh flour. *Wedron Silica Co.*
Circle No. 88, Page 7-8

Silicone lubricants brochure, 8 pp, contains tables of physical properties; also charts on oxidation resistance and shaft-fit and life. *Dow Corning Corp.*
Circle No. 89, Page 7-8

Plastic refractory, slag-resistant, for protecting ladles, spouts, and cupolas, is described in 4-p bulletin. Step-by-step application is shown. *North American Refractories Co.*
Circle No. 90, Page 7-8

Zirconium oxides refractory mixes for ramming and special shapes with physical properties and uses are summarized on product list. *Zirconium Corp. of America.*
Circle No. 91, Page 7-8

Drafting and computation short cuts, tips are contained in 34-p bulletin. Illustrations and formulae are used to show time-saving methods. *Frederick Post Co.*
Circle No. 92, Page 7-8

Lift and hoist brochure, 26 pp, deals with automated hoist handling systems, fork lift trucks, industrial lift trucks, and hand trucks. *Yale & Towne Mfg. Co.*
Circle No. 93, Page 7-8

Gantry cranes, including full gantry, semi-gantry, and special types are discussed in 4-p catalog. *Chicago Tramrail Corp.*
Circle No. 94, Page 7-8

Tooling plastics for laminating, surface coating, casting, and general use as well as accessories are detailed in summary of products. *Rezolin, Inc.*
Circle No. 95, Page 7-8

Rubber pouring basin former is said to aid in eliminating swirl of molten metal causing slag to float, and prevents slag from entering mold cavity. In use, the down sprue pin is wiped clean as the jolt table rises. This wiping action eliminates cutting and blowing out the sprue, keeping the

pouring basin free of loose sand. Device eliminates manual cutting of the sprue and is self-releasing. *Keson Industries.*

For Manufacturer's Information Circle No. 96, Page 7-8

Melting furnace catalog, 36 pp, displays ferrous and non-ferrous melting models including stationary, tilting, holding, reverberatory, barrel, and special types. Units are fired by gas, oil, or electricity. Also has sections on core ovens, oil burners, and centrifugal blowers. *Stroman Furnace & Engineering Co.*

For Manufacturer's Information Circle No. 97, Page 7-8

Welding alloy wall chart gives recommendations for welding cast iron, aluminum, steel, and other metals. Also contains bonding temperatures, tensile strengths, and hardness. *Eutectic Welding Alloys Corp.*

For Manufacturer's Information Circle No. 98, Page 7-8

Shell molding applications and case histories are featured in news bulletin showing how process replaced competitive methods. *Durez Plastics Div., Hooker Electrochemical Co.*

For Manufacturer's Information Circle No. 99, Page 7-8

Gas-shielded welding process using CO_2 and consumable-electrodes is discussed in 4-p bulletin. Gives applications, specifications, and illustrations of automatic welding equipment for ferrous and non-ferrous alloys. *General Electric Co.*

For Manufacturer's Information Circle No. 100, Page 7-8

Plastic casting material reportedly can be cast in any thickness yet possesses low shrinkage. Exothermic heat in any thickness, said not to exceed 200 F. *Furane Plastics, Inc.*

For Manufacturer's Information Circle No. 101, Page 7-8

Magnesium casting alloys bulletin, 40 pp, details four alloy groups now being cast including new Mg-Th-Zr alloys. Eighteen tables and 15 charts give physical and mechanical properties and elevated temperature characteristics. *Dow Chemical Co.*

For Manufacturer's Information Circle No. 102, Page 7-8

Fluidity tester for molten metals provides quick and reliable means of testing by using a controlled partial vacuum to pull a sample of metal into a pyrex tube. The uncontaminated sample may be used for chemical analysis if desired. Unit is self-contained. *Harry W. Dietert Co.*

For Manufacturer's Information Circle No. 103, Page 7-8

Immersion thermocouple measuring up to 3100 F, utilizes a metal-ceram-

ic secondary protection tube, a vitrified alumina primary tube, and a platinum-platinum 10 per cent rhodium thermocouple. Secondary tube gives longer life with fast response and resistance to thermal shock. Curved stainless steel tube of any required length leads to a wooden grip and thermocouple assembly head. *Bristol Co.*

Circle No. 104, Page 7-8

free films

■ **Motion pictures and other visual aids based on foundry processes and supplies are also yours *for the asking.* These films are suggested for formal or informal training groups. The owners of films in this column will send booking request forms to MODERN CASTINGS readers who circle the appropriate number on the Reader Service card (pages 7-8).**

Finishing Rough Casting, slidefilm, 50 frames. Parts of casting to be removed; detailed steps in finishing the casting are shown. *Jam Handy Organization.*

Circle No. 105, Page 7-8

How Not to Conduct a Meeting, 16 mm motion picture, 10-min running time. Stresses mistakes often made. *Public Relations Dept., General Motors Corp.*

Circle No. 106, Page 7-8

Mechanization for Small Foundries, 16 mm motion picture, black and white, sound, 35-min running time. *Beardsley & Piper Div., Pettibone Mulliken Corp.*

Circle No. 107, Page 7-8

The Metal Without an Equal, 16 mm, color, sound, 20-min running time. *Ampco Metal, Inc.*

Circle No. 108, Page 7-8

Malleable Metals, 16 mm, sound, color, 13-min. running time. Shows equipment and methods needed for high production of small castings. *Albion Malleable Iron Co.*

Circle No. 109, Page 7-8

Behavior of Molding Sands at Elevated Temperatures, 16 mm, color, silent, 45-min running time. *Harry W. Dietert Co.*

Circle No. 110, Page 7-8

Grinding Wheel Safety, 16 mm, sound, color, 20-min running time. Safe and unsafe practices demonstrated. *Norton Co.*

Circle No. 111, Page 7-8

the editor's field report

by Jack Schrum

◗ **DON'T OVERSELL YOUR PRODUCT!** We are all engaged in a daily struggle to sell "our product." For some of us this product may be our services; for others it may be a casting, a sand additive, or a piece of foundry equipment. Too often we are so carried away with enthusiasm for our product that we can't resist the temptation to recommend it as a cure-all for every complaint of potential customers. As a result our panacea often leads to pandemonium.

The foundry industry has just passed through an interesting 10-year era during which three new materials and processes have invaded the field. These are shell molding—the CO_2 process—and epoxy resin patterns. In spite of initial over-enthusiastic claims the pendulum of reality has brought these processes into their proper perspective. Green sand molding is still very much in the foundry; so are oil binders and wood patterns.

Behind the impressive trail of success stories for these new processes are just as many, not so highly publicized, failures. Many failures could be avoided if the seller had the courage to say to the customer—"No, don't use my product, it won't help you because it is not suited for your operation." This may lose short term sales volume but will pay off in the long pull.

OVERSIMPLIFICATION of a new process also leads to alienation of affections for the latest foundry fashion. I still remember the first time I tangled with a free sample kit of epoxy resin. "Just follow the simple directions on the label", it said. Before I was finished the resin had welded itself to my master wood pattern, ruined a stainless steel mixing container, and afflicted me with dermatitis.

Today I know of one epoxy resin supplier who will not sell its material to a pattern shop without first bringing the customer into the laboratory for a three-day instruction course. This man will understand the material before he puts it to work. The reputation of a good material can be easily sullied through misuse by an uninformed customer.

▪ Give him all the facts, good and bad, pro and con. Remember, "a little bit of knowledge is sometimes a bad thing." *Be sure your customer has the "know how" as well as a good product suited to the application.*

◗ **AFS BUYERS DIRECTORY:** The first and only complete directory of foundry equipment, supplies and services is now being prepared by the American Foundrymen's Society for release in the fall of 1959. This AFS Buyers Directory will be distributed gratis to every foundry in North America. A biennial publication, the directory will also contain a trade name index, product classification index, alphabetical list of manufacturers, and information on all associations and societies servicing the metal castings field.

A long needed service to the industry, the Buyers Directory will simplify and guide buying procedures by foundries. More detailed information on this important new service appears on page 75 of this issue.

◗ **METAL MIX-UP:** Have you ever accidentally mixed several grades of scrap or pigs in the foundry? If the alloys have similar appearance but markedly different metallurgical characteristics then you are in trouble. Fortunately this problem has been solved by the development of a portable conductivity tester that will sort any scrap mixture. Since every alloy can be identified by its own unique electrical conductivity this instrument rapidly separates such similar materials as aluminum alloy 43 from 195 or leaded tin bronze from high leaded tin bronze.

If you do not care to invest in ownership of such an instrument, it can be rented for a nominal fee from the manufacturer when a mix-up emergency arises.

◗ **GOT THE ZINC SHAKES?** Have you ever worked in a brass foundry where zinc oxide fumes were so dense you couldn't distinguish your fellow workers twenty feet away? Did you become nauseated, break out in a sweat, and shiver as the result of working in such an atmosphere? If so, then you've had the "zinc shakes" and can genuinely appreciate a fume collector that actually catches the zinc fumes at the point of origin so they never enter the foundry working environment. Read about this revolutionary development that makes the "Foundry a Better Place to Work" in the November issue of MODERN CASTINGS.

F.E.F. Starts Campaign to Increase Membership

Activities and membership of the Foundry Educational Foundation are currently being expanded in anticipation of increased need for trained men in the castings industry.

The membership campaign, started in September, is under the direction of L. P. Robinson, active in F.E.F. since its inception in 1947 and a past trustee.

Mr. Robinson entered the foundry business in 1917 and in 1929 became

L. P. Robinson

director of core oil sales for Archer-Daniels-Midland Co. He served as vice-president of A.D.M. foundry products division, Cleveland, from 1950-1956. He is a past director of the American Foundrymen's Society and a former president of the AFS Northeastern Ohio Chapter.

Mr. Robinson will visit the 16 major foundry areas in the United States, working with leaders to further membership in the foundation.

F.E.F. which was started 10 years ago working with five schools, now cooperates with 16 affiliated institutions. The foundation annually contacts 6000 engineering students, stressing opportunities available in the castings industry.

International Congress to Be Held in Belgium

Belgium will be host to the 25th International Foundry Congress and International Exhibition to be held September 29 to October 3, 1958. The Congress will be held in Brussels and in Liege.

Human aspects of foundry problems will be one of the major topics of the Congress. Visits to Belgium foundries and laboratories will be one of the features of the meeting.

The Association Technique de Fonderie de Belgique will have charge of arrangements.

27 Countries Represented at International Congress

■ More than 1100 foundrymen and their wives from 27 countries attended the 24th International Foundry Congress held August 19-24 at Stockholm, Sweden. The International Congresses are sponsored by the International Committee of Foundry Technical Associations, comprising technical foundry groups in 17 countries.

This years' Congress was organized by the foundry associations of Sweden, Norway, Denmark, and Finland. The Swedish group acted as hosts. The Congress was opened by congress president Bror Lagercrantz and Dr. A. B. Everest, president of the International Committee of Foundry Technical Associations.

President Everest presents Association's Award of Honor to Sweden's Yngve Granstrom.

Iv.-Iny Gunther Schwietzke, vice-president of the International Committee invited the delegates to attend next year's congress in Brussels and Liege, Sept. 29-Oct. 3, 1958.

Twenty-eight technical lectures were given on many subjects including CO_2 developments, plastic core materials, hot-blast cupola balance, aging of cast light metals, iron oxidation, carbon pick-up, foundry health and ventilation, hot tear investigations, and molding sand practice.

American Papers

The American Foundrymen's Society was represented by its president, Harry W. Dietert, who presented the official exchange paper, *"Automatic Moisture Control in Foundry Sand."* Richard L. Olson, Dike-O-Seal, Inc., Chicago, also attended and presented his paper *"Engineering Aspects of Core Box Design."* A third American exchange paper, *"The Foundry Environment"* was authored by H. J. Weber, AFS Director of Safety, Hygiene and Air Pollution.

Mr. Dietert also presented the AFS

Service Citation to Vincent Delport, Penton Publishing Co., London, England. Mr. Delport, who was unable to attend the 61st AFS Castings Congress in Cincinnati this May, was awarded the citation for "Distinguished service to the Society as its European representative, especially in connection with the International Foundry Congress.

Plant Visits

Over 40 Scandinavian foundries were open to delegates of the Congress. Visits were made to gray iron, malleable, steel, and non-ferrous plants.

At the closing session, Dr. Everest summarized the work within the International Committee.

Dr. Everest also presented the Award of Honor of the International Committee of Foundry Technical Associations to Mr. Yngve Granstrom of Sweden. Mr. Granstrom has been one of the leading men in the joint research work of the Swedish foundries within the technical society, Sveriges Mekanforbund. He also was president of the International Committee of Foundry Technical Associations in 1955.

G.I.F.S. Annual Meeting Will be Held in Chicago

■ The Gray Iron Founders' Society will hold its 29th annual meeting at the Drake Hotel, Chicago, October 9-11. G.I.F.S. President, J. S. Parrish, Jr., will preside.

Among the featured speakers will be J. L. Powell, Office of Assistant Secretary of Defense, Washington, D.C.; R. A. Foulke, vice-president, Dun & Bradstreet, New York; and C. V. Nass, vice-president, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago, and president, Foundry Educational Foundation.

A Thursday afternoon session on the industry's terms and conditions of sales will be moderated by P. E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, Ohio, and C. C. Williams, Jr., partner, Jones, Day, Cockley and Reavis and G.I.F.S. legal counsel. Following the session, C. F. Walton, G.I.F.S. Technical Director, will speak on *"The Basic Elements of Cast Iron Microstructure."*

Friday morning, H. Brown, sales manager, Hunt-Spiller Corp., Boston, will present *"Developing Sales and Salesmen."* The 1957 citations and awards and 1957 design contest awards will follow presentation of new officers and directors on Friday afternoon.

patent review

MELVIN NORD, *Dr. Eng. Sci., LL. B*
Consultant in Law and Engineering

Core Blower Controls

Control system for core or mold blowing machine automatically determines the blowing cycle while limiting the pressure in the mold or core box and the rate of positioning the mold or core box into blowing position. Control system assures that the pressure mold or core box never exceeds safe limits. This simplifies the design of molds and core boxes and reduces the need for venting. 2,779,071 *and* 2,779,074, *issued Jan.* 29, 1957 *to Heinrich J. B. Herbruggen and assigned to The Federal Foundry Supply Co.*

Sand Conditioner

A foundry production machine that integrates shakeout and sand reconditioning has been patented. The machine incorporates a vibrating shakeout and a conveyor that removes sand from the shakeout. While sand is being transported on the conveyor, it is automatically tempered and conditioned. 2,778,076, *issued Jan.* 22, 1957 *to Millard J. Bell.*

Nodular Iron

Low-oxygen, low-sulphur nodular iron castings can be produced by a new patented process. The charge to a basic lined cupola contains 9-12 per cent limestone, 2-5 per cent fluorspar, and 575-650-lb of coke to each 2920 lb of metallics.

Air is injected into the cupola at a number of points. The blowing rate is regulated to produce an iron saturated with carbon and to produce a slag having manganese oxide content of 0.1-0.4 per cent.

The cupola is tapped into ladles which contain a granulated basic cupola slag containing 5-20 per cent by weight of calcium fluoride. A magnesium-bearing alloy is added in an amount which will leave a magnesium residual of 0.005-0.30 per cent. The

metal is inoculated and cast. 2,779,675, *issued Jan. 29, 1957 to Gosta Vennerholm and Harold N. Bogart and assigned to Ford Motor Co.*

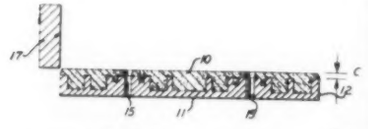
New Flask

New flask design has continuous rail surfaces to ride a roller conveyor. 2,778,078, *issued Jan. 22, 1957 to Lester C. Young and assigned to Spo, Inc.*

Strike-Off for Shell Molds

Less paste is used in assembling shell molds for stack pouring when a new method of striking-off the molds is used.

The pattern used with this method consists of a base (11) surrounded by side walls (12). The pattern



is provided with a central gate (14) and four corner risers (15). Each of the risers has a substantial metal collar.

Sand is heaped on the pattern and struck-off with the strike-off bar (17). The bar does not contact the pattern, but clears it by a substantial amount (C). The wall around the pattern is just as high as the highest part of each pattern.

When the mold is struck-off and cured, the structure shown in the lower picture results (shrinkage is exaggerated in the illustration.) Re-

sulting mold has a minimum sand depth over the side walls and around the gates and risers.

This shallow layer of sand heats and cures more rapidly than the adjacent thicker lay and shrinks less.

When completed molds are assembled and stacked, the actual contact between assembled molds is limited to the area over the side walls and surrounding the risers and gates. Such a stack requires a minimum of pasting and the sand collars surrounding each metal passage prevent misruns. 2,771,649, *issued Nov. 27, 1956 to Julius M. Bleuenstein and assigned to Ford Motor Co.*

Circle No. 144, Page 7-8

Improve Casting Design by Observing Stress-Strain

Ross L. Gilmore / *President*
Superior Steel & Malleable Castings Co.
*Benton Harbor, Mich.**

■ Our interest in casting design at Superior is three-fold. First we are interested in the casting system—the casting plus the heads and gates; second, the finished casting as it is ready for the customer; and third, the final machined shape of the casting.

At Superior we refuse to work with so-called casting drawings, because, in the vast majority of cases, they do not fairly represent the final shape from a design standpoint. We request that the customer furnish a finished machine drawing marked with set-up points and load vectors.

Stresses Not Equal

We have never found a cast component that was equally stressed throughout. By determining the high and low stress areas you have considerable latitude in altering the metal sections so that feeding systems can literally be built into the casting.

In our particular set-up we have two basic methods of determining strain – strain gages for quantitative determinations and brittle lacquers for qualitative. All our calculating is arrived at by the use of some variation of these two methods.

Lacquer and Strain Gages

Brittle lacquer and strain gages are used for both static and dynamic determinations. However, due to the qualitative nature of most brittle lacquer, we confine this tool largely to static determinations. It can be used in dynamic tests for qualitative determinations when:

1. A high degree of accuracy of strain determination is not required.
2. Extremely accurate temperature-humidity controls are exercised so that lacquer coatings can be accurately calibrated.

More accurate quantitative and dynamic strain measurements are made with strain gages attached to test models.

These methods allow us to ascertain the loads which are applied to castings and an accurate method of determining the strains caused by these loads. *Proper use of this information leads to good casting design.*

* This article is an abstract of a talk presented by Mr. Gilmore at the Penn State Foundry Conference, June 21, 1957.

Improving Negotiations to Be Discussed by N.F.A.

■ Ways and means of preparing foundry management for union negotiations will be discussed at the 59th annual meeting of the National Foundry Association. The meeting will be held November 7-8 at the Waldorf-Astoria Hotel, New York.

N.F.A. President P. L. Arnold will open the Thursday session at 9:00 am. The morning program will include: *"Anticipated Demands of Foundry Unions in 1958,"* James I. Poole, Fairchild, Foley & Sammond, Milwaukee; *"Developing Effective Employee Communications,"* Dr. Paul Mundie, Humber, Mundie & McClary, Milwaukee. Dr. Kenneth McFarland, lecturer, will address the luncheon.

In the afternoon a skit entitled *"The Eneff Ay Foundry Company Prepares for Negotiations,"* will be staged. The skit will show step-by-step procedures in negotiating a labor agreement.

Phases to be covered include a discussion of the various techniques, devices, arguments and counter-arguments used and how to prepare for the next session as the contract expiration date approaches.

Thursday's activities will conclude with installation of officers and a reception.

On Friday the skit on management strategy in negotiations will be continued. D. M. K. Smith, Opinion Research Corporation, Princeton, N. J., will be the luncheon speaker, discussing *"How Public Opinion Affects Management."*

The meeting will conclude at 2:30 Friday with a review of the two-day program.

questions and answers

Misery loves company so why not share your castings problems with us? MODERN CASTINGS invites you to "stump the experts" with tales of gremlins that are haunting your scrap piles. If any of you readers have better answers to the questions below, write the editor.

shoot or blow?

Q. What is the difference between core shooting and core blowing?

A. Core shooting uses expanding air to move a mass or slug of sand from the sand magazine into the core box cavity through a large blow hole. Blow hole opening is usually from 2 to 4 in. diameter. The air is allowed to quickly expand into the magazine and literally extrude a slug of sand into the core box. Because of the nature of its action shooting is limited to open-faced boxes with a simple and regular shaped cavity.

Core blowing introduces a steady supply of high pressure air into the magazine. This air permeates sand completely and propels the sand through a number of small holes in the blow plate. The stream of air and sand ram the sand into the box. Cores with complex shapes are best made by this technique. Because more air enters the box during blowing than shooting, venting is more of a problem when blowing cores.

guards for tumblers

Q. Do tumbling barrels or mills require any safety guards?

A. Indeed they do. In fact a number of states have set up rigid requirements to be met by such installations. Whether or not your state insists, it behooves you to protect your workers from possible accident. All tumbling mills should be equipped with a positive locking device that will

prevent the mill from turning over when loading or unloading the mill.

This device should be strong enough to prevent the turning of mill due to unbalancing of the load in the mill or by the motor driving it. "Brakes" are not considered a positive locking device.

If the tumbling mill is not provided with a complete enclosure then a standard height guard rail should be erected so as to completely protect workers from the exposed parts of the mill when operating.

fireproofing

Q. Can wooden bottomboards be made fireproof?

A. If not fireproof, they can be at least made fire-retardant by several techniques. Boards can be painted or soaked in a solution of sodium silicate (water-glass). Considerable improvement in resistance to charring or burning from hot metal will result.

A complete description of this and several other practices leading to longer service life of wooden bottom boards is described in "8 *Rules to Save Bottom Boards*" by M. Applefield, MODERN CASTINGS, Nov., 1956. Another "trick-of-the-trade" is to drill holes in 1/4-in. thick asbestos-cement boards and nail to the top surface of wooden bottom boards.

desulphurize without slag

Q. We have been desulphurizing our cast iron with soda ash in the pouring ladle but have been having considerable trouble with slag in the metal. How can we desulphurize and still have clean slag-free metal?

A. Soda ash should not be used in the pouring ladle. This sulphur removal operation should be conducted in a forehearth or large reservoir ladle holding a substantial quantity of metal so that the soda ash is in contact with the metal for a long period of time.

The efficiency of sulphur extraction by this technique is proportional to the temperature of the metal, the quantity of soda ash used and the length of time the metal is in contact with the soda ash. By using your pouring ladle for this operation you cannot hold the metal long enough and you can't avoid entrainment of the very fluid slag in the metal as it is poured.

new books

Properties of Molding Sands Under Conditions of Gradient Heating . . N. C. Howells, R. E. Morey, and H. F. Bishop. 14 pp. PB 121540. Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. 1956. $0.50.

A new hot strength test was devised at the Naval Research Laboratory to determine properties of molding and core sands. The test differs from the conventional isothermal test by reproducing in a compression test specimen the thermal gradients that surround a solidifying casting. A compressive strength vs temperature curve obtained was relatively smooth and showed a continuous decrease instead of the sharp peaks and valleys of the conventional test curve. Various molding and core sands were tested under conditions representing mold interface regions for castings that solidify at 2000–2400 F.

It was found that hot strength and modulus of elasticity do not predict the hot tearing susceptibility of steel castings. Instead, a correlation exists between dry density of the sand and bore cracking.

Investigation of Metallurgical and Mechanical Effects in the Development of Hot Tearing . . H. F. Bishop, C. G. Ackerlind, and W. S. Pellini. 20 pp. PB 121049, Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. 1956. $0.75.

This paper is aimed at developing further information concerning the role of strain rate, as established by the contracting characteristics of solidifying metal on the development of hot cracking in castings. Three types of tests were conducted on a variety of alloys in order to establish a correlation between observed hot-tearing characteristics and metallurgical and mechanical characteristics which lead to hot tearing.

Development of Steel Castings for Artillery Components . . C. F. Frey. 26 pp. PB 111967. Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. 1955. $0.75.

Report of an Army Ordnance Corps investigation which determined that casting certain ordnance items, instead of forging, is feasible. A cast high-pressure cylinder head for the 120 mm gun was effectively substituted; also a top cover, bottom cover assembly, and block manifold for the 280-mm gun.

The Constitutional Diagrams of Alloys: A Bibliography (2d ed.) . . J. L. Haughton and A. Prince. 323 pp. The Institute of Metals, 17 Belgrave Square, London, S.W.1, England. 1956. Members: $3.00; others $5.50.

This new edition contains approximately twice as many references as the first, which appeared in 1942. It has been brought up to date to the end of 1954 in as comprehensive a manner as possible. In the case of many journals,

work published up to the middle of 1955 has been included. Wherever possible, a reference to an Institute of Metals abstract has been included, along with the original reference.

The Foundations of Metallography . . (4th ed.) Georg Masing. Translated by F. C. Thompson. 166 pp. The Institute of Metals, 17 Belgrave Square, London, S. W.1, England. 1956. Members: $2.00; others $3.50.

Based upon the author's lectures, this textbook differs from others of its type by its brevity and its deliberate restriction to fundamentals. Written in German, it was translated by a University of Manchester professor of metallurgy, who states that this is the nearest approach to the perfect presentation for elementary students that he has seen. After considering the field of metallurgy it deals with the atomic structure of metals and alloys. There are three chapters on structure of alloys: systems without solid solutions or compounds; compounds; and solid solutions. Next considered are the process of crystallization; changes in the solid state; heat-treatment; plastic deformation; internal stress; recrystallization and corrosion and oxidation.

AFS Publishes Annotated Bibliography on Cupolas

An annotated bibliography of cupola operations, 1953-55, with more than 200 references has been published by the American Foundrymen's Society. The bibliography in bound form supplements the references listed in THE CUPOLA AND ITS OPERATION, published in 1954.

Copies may be obtained from AFS Headquarters, Golf & Wolf Roads, Des Plaines, Ill. Price for members is $2; non-members $4.

Alloys with Cast Iron Base Have High-Heat Resistance

■ Iron-base alloys having a creep-rupture strength at 1600-1800 F approaching that of cobalt-base alloy H.S. 21 have been developed. The new alloys have a minimum Fe content of 45 per cent, minimum C content of 0.50 per cent, Cr not less than 20 per cent, and between 27 and 32 per cent Ni, part of which could be replaced by Co.

These alloys, strengthened with a 5 per cent addition of Cb, Ta, Mo, and W were equal to H.S. 21 in oxidation resistance at 2000 F but inferior in short-time cold and hot tensile strength, cold ductility, and resistance to thermal shock and thermal fatigue.

The results are contained in "Development of Cast Iron-Base Alloys of Austenitic Type for High Heat-Resistance and Scale-Resistance," 99 pages. PB 121950. Office of Technical Service, U. S. Dept. of Commerce, Washington, D. C.

MARKETING

A 4-STEP PLAN TO SELL CASTINGS

- **FIND POTENTIAL BUYERS**
- **LEARN WHAT THEY NEED**
- **GIVE THEM WHAT THEY NEED**
- **PUBLICIZE YOUR ACCOMPLISHMENTS**

R. C. MELOY / *Marketing Director*
Gray Iron Founders' Society
Cleveland

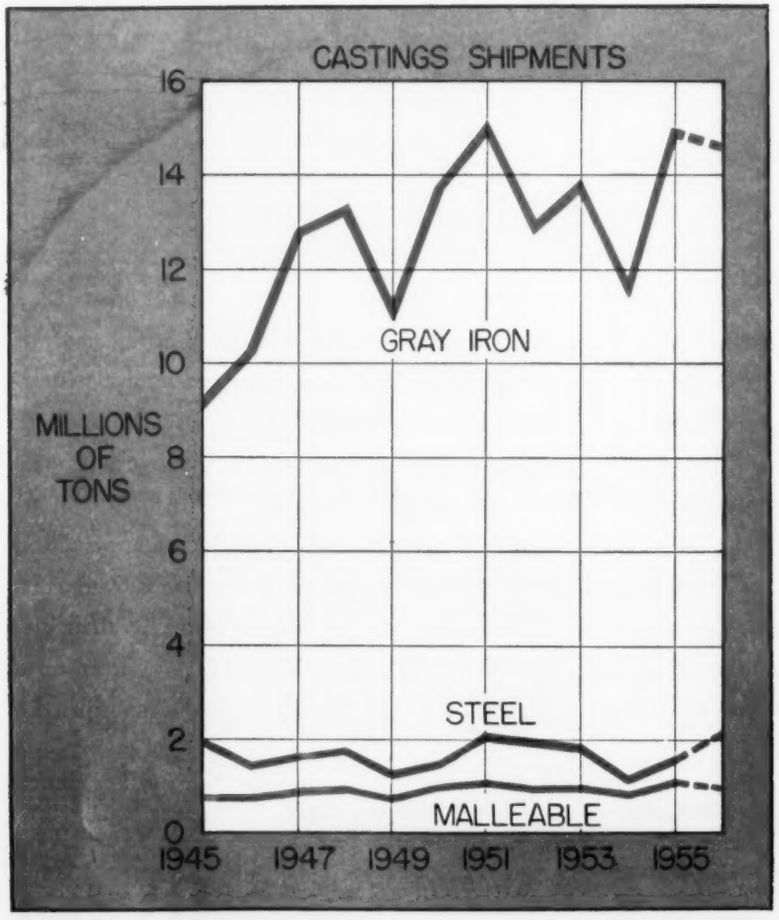


Fig. 1 . . Comparison of gray iron, steel, and malleable shipments.

The gray iron foundry industry can make substantial gains on competitive materials and processes by developing alert marketing programs. Any such program needs the combined efforts of both top management and practical operating men in the shop.

Before we can properly focus on plans for future growth of the industry, let us take a glance backward to see what has already been accomplished in the way of production.

The graph in Fig. 1 has been prepared to show the magnitude of annual gray iron casting shipments in comparison with shipments of steel and malleable iron castings. During this 1945-1955 period, shipments fluctuated markedly between a low of 9 million tons and a high of 15 million.

Who produces all these castings? In 1955 about 2400 gray iron foundries accounted for this production. In spite of a growing annual output, the number of gray iron foundries in operation has decreased by 666 since 1947.

Trends

Now let us compare the gray iron foundry industry with durable goods production which might be considered to represent our customer industries. (Fig. 2). "Miscellaneous Gray Iron Castings" accounts for all except car wheels, soil pipe, pressure pipe, and ingot molds. It amounts to about 60 per cent of the total and includes all familiar castings such as automobile blocks, machine tool bases, bathtubs, and thousands of component parts in all kinds of machinery.

Durable goods production seems to be following a different growth pattern than miscellaneous gray iron castings. This is partly due to the tremendous impact of new materials and methods; it is due to the competitive battle in our customer industries to lower weight and cost in their products; and you might even say our improving standard of living is partly responsible.

More stoves and furnaces are being sold today than ever before. But with gas, oil or electricity available to about 99 per cent of our population, these products have switched from cast iron to steel.

So many people are buying power lawn mowers that manufacturers have switched to die cast motors.

However, our increasing standard of living is also opening up new fields for gray iron castings. The second car in every seventh garage represents a tremendous market; and compressors for air conditioners are a fast-growing market.

The P.A. Says—*"Invite your buyer and his key men to visit your foundry so that they understand casting techniques."*

Competition

That is one side of the picture. Another side which has dark as well as bright spots is the competitive story. Admittedly, the cumulative effect of the tremendous advertising campaigns of competitors

is making our job harder.

However, this brings up one of our potential strong points in the foundry field: gray iron foundries are not large as measured by the aluminum companies, for example, but there are a lot more of us! If we get together on a real selling program, we should be able to hold our own. We have a lot more to sell today than ever before. Metallurgical developments have widened the range of properties of gray iron. In fact, we have a whole family of irons to offer American industry.

With more to offer, why then have we experienced such a heavy mortality of gray iron foundries in recent years? One reason may be that foundrymen consider other foundrymen as their principal competition rather than the forces which actually have been taking our business away—*other materials and processes.* Also more than one foundryman has gone out of business, because after years of consistent orders from one customer, he was lulled into believing he had a market no one could take away from him.

He may have been right. Maybe no one person could take it away. But there are many factors that can cause a castings business to evaporate. In fact, there are too many. Consider these:

- New materials or new designs with other materials – street light poles and warm air furnaces, for instance.
- New products—electric ranges, automatic water heaters.
- Volume production which justifies new processes—stamped bathtubs, hardware; die cast gasoline engines.
- Mergers, strikes, fires can affect customers and a foundry's business with them.
- Finally, a foundry's present customers are vulnerable to competition.

The P.A. Says—*"Improve casting appearance if you want to check trend toward weldments.*

Better Marketing

With all these hazards facing us, you may say, how can we have confidence in the future? Progressive foundries recognize that they don't have to accept this gloomy situation in the market place. Better marketing can overcome a large part of these obstacles facing any one foundry.

Marketing is a word which is taking on new dimensions and it is a word which is apt to mean quite different things to different people. Marketing techniques vary from one industry to another and they change from time to time within the same industry; but the overall concept is the same. Fundamentally, it is a scientific approach to moving goods into the hands of the consumer—*learning want and satisfying their wants and needs.*

Marketing is a team effort; and you come into the marketing picture by supplying the wants and needs of customers and prospects. The Gray Iron Founders' Society knows what those wants and needs are, because we asked thousands of buyers and design engineers in two separate surveys last fall.

Over 700 castings buyers and 1500 product designers in customer industries returned our questionnaires with very thoughtful and helpful answers. Questionnaires were signed by over 80 per cent of those replying, many of them in the top management group of their companies—presidents, general managers, treasurers, as well as purchasing and engineering people.

Buyer's Wishes

A lot of things were learned

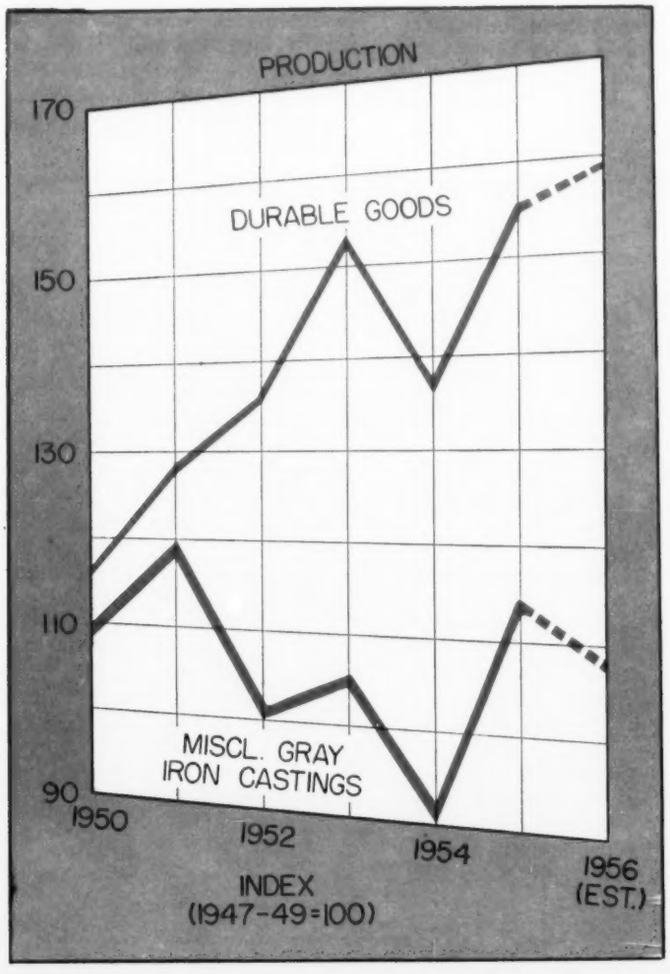


Fig. 2 . . Gray iron castings have declined as durable goods increased.

Fig. 3 . . Customers want better pattern services from foundries.

What Buyers Want

. . . from their gray iron foundry sources, and what foundries offer.

Service

What do you require from gray iron foundries?

PLEASE CHECK ☑ WHETHER YOU NEED	Occasionally	Generally	Don't Need*
Take care of heat treating our castings	28%	16%	56%
Grind locating pads for machining	15	10	75
Take care of complete machining	12	3	85
Keep patterns in good repair	12	70	18
Make pattern revisions	45	33	22

* *Includes "NO ANSWERS"*

How would you rate foundry pattern service as regards:	Satisfactory	Could be Improved
Prompt information on need for repair	49%	51%
Suggestions on changes in pattern equipment to lower casting cost	29%	71%

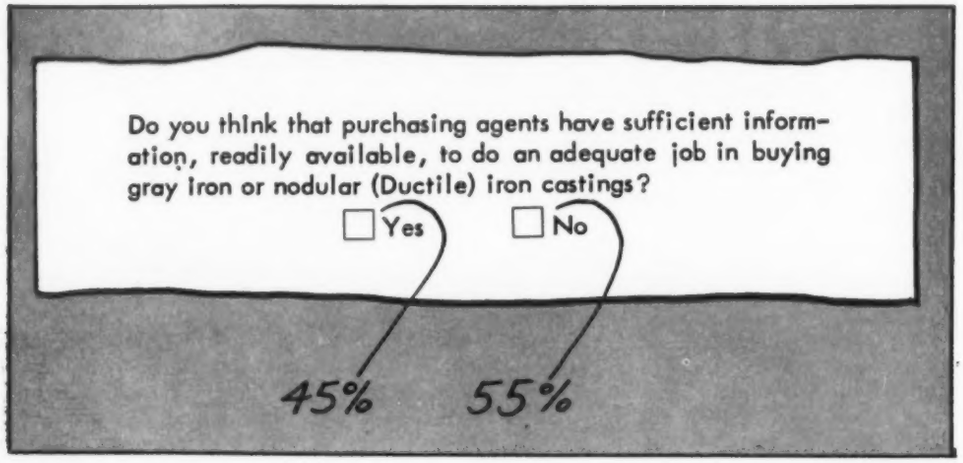


Fig. 4 . . Majority of purchasing agents indicated that they were not properly informed.

about castings salesmen and what engineers would like in the way of improved properties. Of most interest to you were the answers received from buyers regarding what they would like foundries to do better.

First, what services do buyers want? Nearly half the buyers expect foundries to take care of heat treating castings when necessary; only 25 per cent require foundries to grind locating pads for machining; and only 15 per cent expect foundries to take care of complete machining. But over 80 per cent expect foundries to keep patterns in good repair. And almost 80 per cent expect foundries to make pattern revisions. So when it comes to patterns, foundries can be of most help to their customers—*but are they?*

Buyers, unfortunately, don't think so. Buyers were asked how they would rate foundry pattern service as regards prompt information on need for repairs. Only 49 per cent checked "Satisfactory"; 51 per cent checked "Could be improved."

When it comes to suggestions on changes in pattern equipment to lower the casting cost, 71 per cent of the buyers felt this "Could be improved." One buyer wrote, "Our experience shows foundries overlook this point altogether." Another buyer noted, "Too many foundries take too many chances in regard to faulty equipment."

One buyer said, "Foundrymen are too timid to tell us we are wrong." One big trouble with the castings business is that our customers, both engineers and buyers, don't know as much about gray iron and the casting process as they themselves think they should know.

We, in the foundry business, are not doing as much as we could do to educate them. One engineer wrote, *"Remember an engineer will not use anything he is not well-acquainted with. Provide good information and plenty of it in an attractive book and the use of gray iron castings will increase* 100%."

The survey asked buyers, "How important to you are the following casting properties: Appearance, Machinability, Special Dimensional Accuracy, Special Finish, such as plating, painting, etc., and Specified Minimum Strength?"

"Machinability" was rated "Extremely Important" by 82 per cent of the buyers and "Fairly Important" by an additional 14 per cent. Only 4 per cent claimed it was not an important factor. "Appearance" is also an important property, so are "Special Dimensional Accuracy" and "Specified Minimum Strength." The larger buyers attach greater importance to Accuracy and Strength than other buyers.

What P.A. Wants

Let us consider the "pay off" question. We told buyers, "Admittedly all of the following characteristics are important, but how would you rate them as to relative importance in placing a casting order? (Please rank 1, 2, 3, in order of importance.)" Of the first place votes 66 per cent were for *Quality*, 18 per cent for *Price* and 15 per cent for *Delivery*. When the votes were given a weighted average, *Quality* still came first.

Many foundrymen will probably doubt that purchasing agents will put Quality above Price, but buyers have certain quality standards below which they dare not fall. Once they have determined that two or more foundry sources meet their standards then Price and Delivery are the determining factors. With the pressure buyers are under to get the best possible price, it is surprising that Delivery is considered almost as important as Price.

The great importance of Quality and Service is shown in the buyers' free hand comments and suggests that no marketing program can succeed unless it is founded on giving customers the quality and service they require.

When you deliver castings which have poor appearance or are obviously defective you jeopardize business.

When you turn out a batch every now and then which are hard to machine, you commit a cardinal offense.

When you accept poor pattern equipment or go blindly ahead with an impossible design, you may be trying to prove what a good foundryman you are, at the expense of being a poor businessman.

When you push a tough casting job out of the schedule for 3 or 4 days so you can complete some nice, long run, you may be giving your customer an ulcer.

So you see that the selling and marketing function starts in the foundry, not with the salesman's line of patter. You have to give your salesman some hard hitting arguments in the way of consistent quality and heads-up service before he will gain the confidence he needs to show customers and prospects why your organization deserves more of their business.

The P.A. Says—*"Don't ship questionable castings—scrap them at the foundry, not in the customer's shop."*

The Pay-Off

Top management is doing more about marketing than ever before. They are finding that marketing pays off. *With the backing of everyone in the shop, we will begin to serve our customers better and they will better understand the possibilities of using more gray iron castings.*

As a result foundries will realize an increase in profitable business and will be better able to withstand the inroads being made by competitive materials and processes. In that way, we can look for a stronger gray iron foundry industry in the future, with greatly expanded opportunities for those who catch the marketing spirit.

The big decisions in this regard are up to top management but the myriad of little decisions which can support management are up to all of the others in the organization.

■ This article is based on a talk given by the author at the Penn State Regional Foundry Conference on June 20, 1957. A limited number of copies of this article are available for free distribution while the supply lasts. Circle No. 2, Reader Service card, Page 7-8.

WEIGHING MOLTEN METAL WITH LOAD CELLS

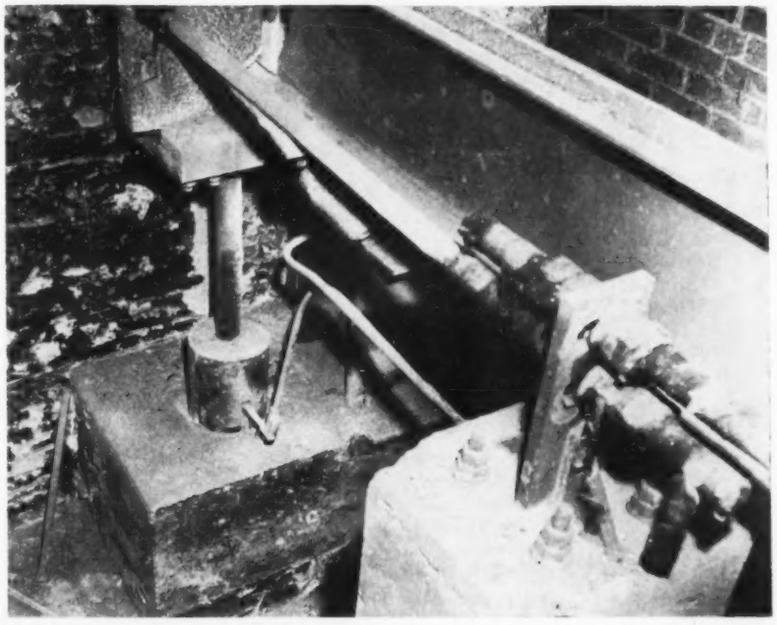
Electrical system provides fast, accurate weighing under adverse conditions for Armco's Sheffield Division

By substituting electrical load cells* for previous equipment used in weighing molten metal, numerous benefits were derived by the Sheffield Division of Armco Steel Corp., Houston, Texas. The risk of damage to weighing equipment of this type is more remote. Cost and time required to repair any damage is lower. Difficult-to-maintain mechanical linkages are eliminated since weight on the cells is measured by changes in electric current electrical changes.

*Load cell contains a matched set of four wire strain gages connected as a balanced wheatstone bridge. When a load is applied wires are distorted changing the output voltage. Voltage varies proportionally with the load which is read on a calibrated instrument.

System Uses Four Cells

The Sheffield installation uses four load cells. The cells support an I-beam platform on which the ladle rests during tapping. Tapping is controlled from a booth along side the weighing platform. The booth contains an instrument into which load cell outputs feed. By watching the instrument readings, the operator continuously knows the exact weight of hot metal in the ladle throughout pouring. Cells are temperature compensated and sealed against moisture and corrosion. They transmit the readings by electrical impulse through cables rather than through mechanical linkages, so that their transmission system is impervious to errors caused by wear and incrustations of dirt, lubricants and other foreign matter.



Hot metal spills can't damage load cells at bottom of weighing pit.

Load cells indicate weight of metal at any moment during tapping.

Cells can be mounted in such a way that hot metal spills will not reach them. Situated on pedestals in the bottom of weighing pit, they are above the reach of any overflow of metal into the pit. No closer to the ladle than 4 ft 10 in. at their nearest locations and partially shielded by an I-beam platform, the cells are well protected from direct overflow.

Metal housings protect cells from damage by splatter from spilled metal. Because these cells weigh and register their readings electrically, their locations may be governed by safety requirements and convenience rather than by mechanical limitations.

In establishing this system, Sheffield preferred to use the simplest possible setup: four cells and an instrument.

To do this and still safeguard cells against overload and impact damage, they used four cells rated at 100,000 lb each—an aggregate capacity of 400,000 lb—to weigh loads averaging about 50,000 lb.

The use of a cell capacity so much larger than loads being weighed eliminates any need for automatic controls and safety interlocks.

Weighing with the system is instantaneous, continuous and very accurate. The instrument indicates weight of ladle contents at any moment during the pour.

There is no lag in the system. The installation gives an initial weight with an accuracy of ±0.25 per cent and can repeat weights to an accuracy of ±0.10 per cent.

■ A limited number of copies of this article are available for free distribution while the supply lasts. Circle No. 1, Reader Service card, Page 7-8.

AFS PLANS DOUBLE-BARRELED PROGRAM

• CONGRESS to reveal technical advances

A comprehensive range of current and future technical developments are promised to those attending the AFS 62d Castings Congress.

Technical papers from all Society Divisions are being submitted to AFS Technical Director S. C. Massari at the National Office, Des Plaines, Ill.

One of the features of the Castings Congress is the Charles Edgar Hoyt Annual Lecture presented by an outstanding man either in or associated with the castings industry. AFS President H. W. Dietert has announced that the 21st Lecture will be presented by W. E. Remmers, Vice - President, Union Carbide Corp. on a subject yet to be selected.

The Hoyt Lectures cover technological and managerial subjects. The high standards set by this series is demonstrated by the five previous lectures.

AFS President H. W. Dietert

In 1953 J. H. Smith, general manager, Central Foundry Div., GMC, Saginaw, Mich., presented *"Outstanding Opportunities for the Foundry Industry."* In 1954 H. F. Dietert, Harry W. Dietert Co., Detroit, now AFS President, talked on *"Processing Molding Sands."* The 1955 Hoyt Lecture was given by F. J. Walls, manager of technical section, International Nickel Co., Detroit, and former AFS President. His subject was *"Education and the Future Foundryman."* In 1956 S. C. Massari, AFS Technical Director, spoke on *"Marketing Your Product."* The 1957 Hoyt Lecture was presented by H. Bornstein, retired, on *"Progress in Iron Castings."*

Hoyt Lecturer W. E. Remmers

The Northeastern Ohio AFS Chapter, serving as host for the Congress and Show, will assume responsibility for such activities as publicity, plant visitations, reception, and ladies entertainment. Chapter Chairman E. C. Jeter will direct these responsibilities.

• SHOW to demonstrate practical applications

The most forward-looking Foundry Show in the history of the American Foundrymen's Society is indicated by the unusual amount of interest shown at this early date in the Castings Congress and Exhibit to be held in the Public Auditorium, Cleveland, May 19-23, 1958.

Applications for space are being received at an unprecedented rate, from as far away as England and Germany. Many inquiries are coming from companies which have never exhibited previously.

The 1958 AFS Foundry Show is expected to surpass any similar exhibit previously sponsored by the Society. Despite the vastness of the Cleveland exhibition space, interest will be sustained throughout six halls by strategic distribution of operating exhibits.

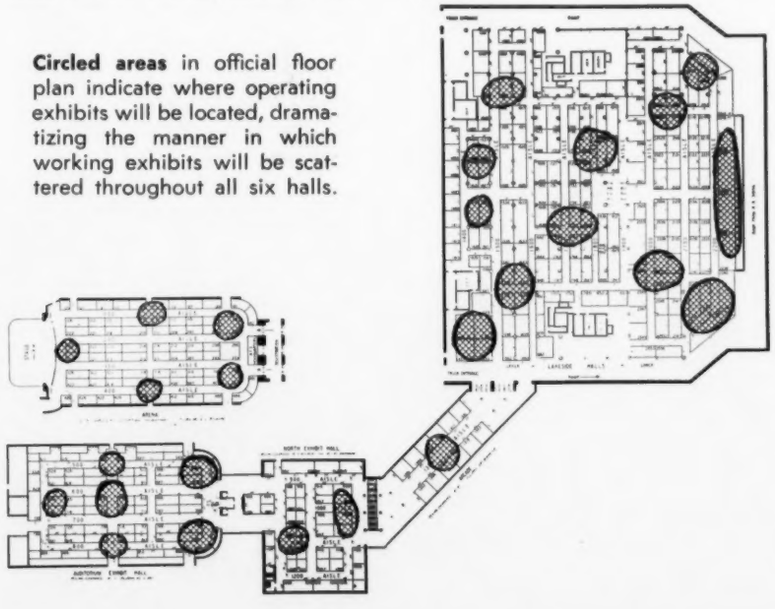
The circled areas in the accompanying official floor plan indicate designated areas where operating exhibits will be located and dramatize the manner in which the working exhibits will be scattered throughout all halls of the Cleveland Public Auditorium.

This panorama of the latest foundry equipment and processes will appeal to small foundries as well as large. Not only will the exhibitions interest all sizes but all types of foundries in the castings industry.

F.E.M.A.'s D. E. Davidson

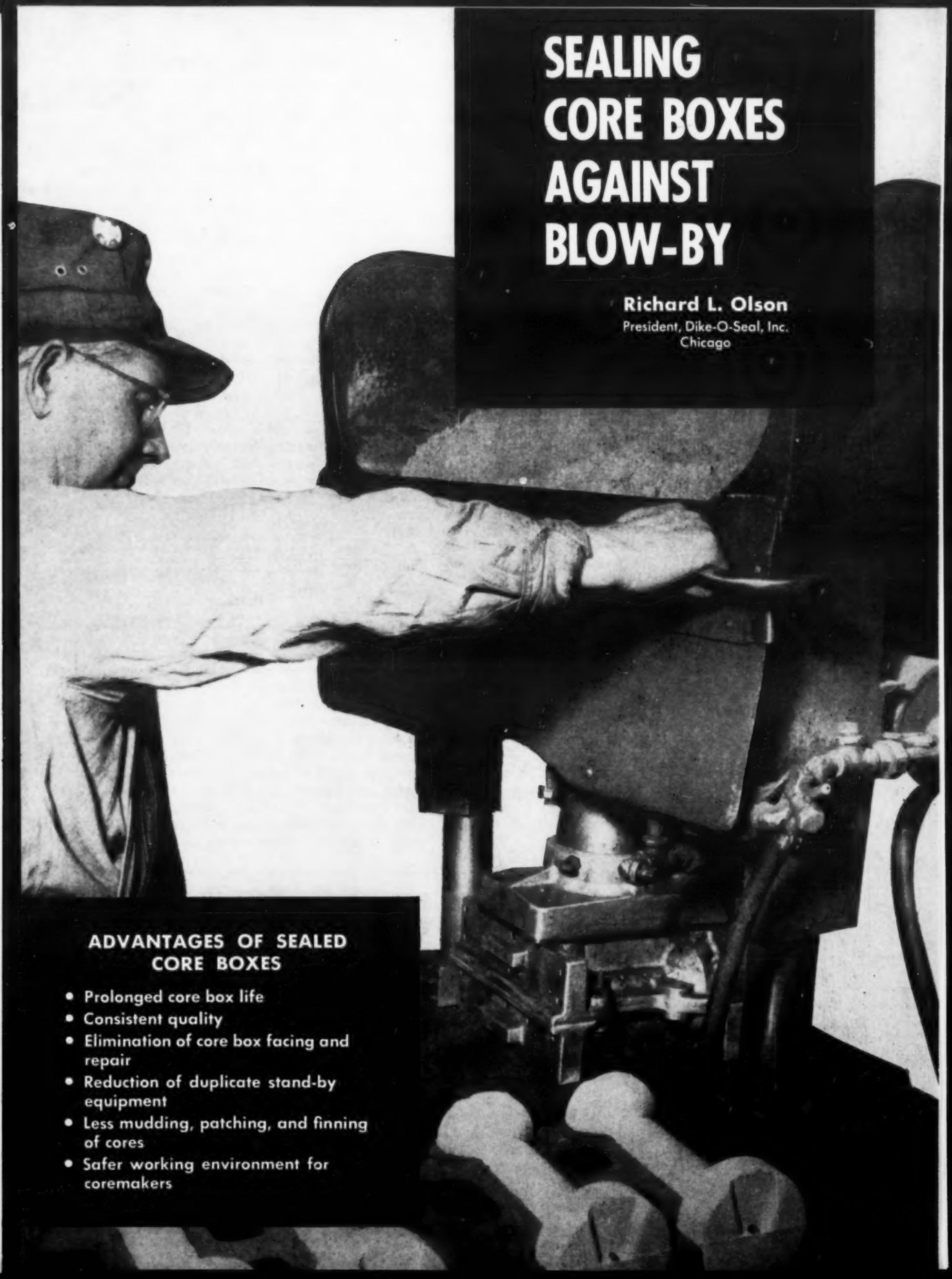
Reaction of foundry equipment manufacturers to the Foundry Show was summarized by D. E. Davidson, president of the Foundry Equipment Manufacturers Association, who stated, "The F.E.M.A., numbering some 59 of the most prominent manufacturers of equipment for the foundry industry, for many years have looked upon the AFS Foundry Show as an outstanding means of demonstrating their equipment and introducing new products and processes."

Circled areas in official floor plan indicate where operating exhibits will be located, dramatizing the manner in which working exhibits will be scattered throughout all six halls.



SEALING CORE BOXES AGAINST BLOW-BY

Richard L. Olson
President, Dike-O-Seal, Inc.
Chicago



ADVANTAGES OF SEALED CORE BOXES

- Prolonged core box life
- Consistent quality
- Elimination of core box facing and repair
- Reduction of duplicate stand-by equipment
- Less mudding, patching, and finning of cores
- Safer working environment for coremakers

With the introduction of core blowers into the foundry coreroom, problems have been created involving the erosive forces of air and sand. These forces have been intensified by concentrating them in the limited confines of core boxes.

The resulting wear on core box cavities and especially on parting surfaces of core boxes leads to expensive refacing of boxes so eroded. Production losses and expenses entailed in constantly making these corrective repairs have been and continue to be a major concern of the industry.

Conception of and elementary experimentation by the writer with a dam-like barrier along the parting line of a core box indicated a possible solution to the problem of erosion damage. Accordingly, a research program was instituted for practically and effectively applying this means of eliminating an aggravating and unceasing source of expense to the foundry industry.

The writer presented preliminary results and findings of these investigations at the 59th Annual Meeting of the American Foundrymen's Society in Houston, Texas in May, 1955. This paper, entitled "Sealing Metal Core Boxes Against Blow-By" has been published in vol. 63 of the AFS TRANSACTIONS. Since this preliminary work much more has been learned of the requirements for applying the dike*-type dam or seal to simple as well as extremely complicated core boxes. Additional findings concerning engineering and design of core boxes for this practical corrective measure are contained in this article.

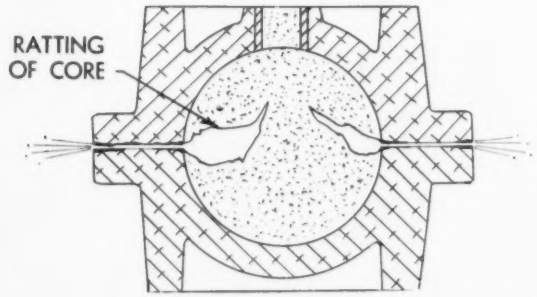
In the face of today's competition, the difference in the quality of a casting, as well as profit and loss, can often be found in the coreroom equipment and methods. Costly production line delays result when core boxes are being repaired for blow-by damage or when cores must be mudded and patched. These delays are directly reflected in the prices you must obtain for your castings.

Most core box damage comes from blow-by that erodes core box partings, and from excessive clamping pressure against stray sand grains which destroy the facings. Blow-by begins as a small leak that increases with every blow. This leak may occur when stray grains of sand or foreign matter on the parting faces prevent closing them properly. Parting faces are permanently damaged by sand embedded in metal by high clamping pressures.

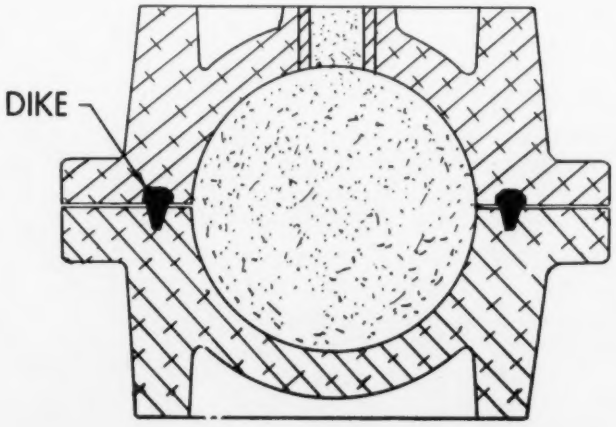
Duplicate sets of coremaking equipment are made for stand-by use when repairs are needed. This practice is costly both in the initial expense and in the down time that is lost to change over, when repairs are necessary.

*Dike as used in this article is the exclusive trademark property of the author. United States and foreign patents have been applied for.

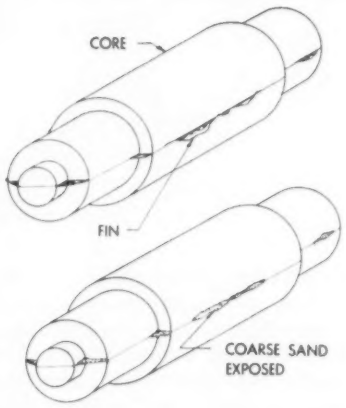
■ This Bonus Section is based on a paper "Engineering Aids for Sealing Core Boxes Against Blow-Bys" which was presented at a Pattern Session of the 1957 Castings Congress.



DEFECTIVE CORE . . . . A cross-section view shows core damage resulting from blow-by. Air leaking through these eroded areas produces a channeling hole in the core, commonly referred to as a ratting or piping hole. As blow-by increases so does void size and channeling within the core. This defect is normally repaired by closing the voids and surface openings with a refractory clay wash. This mudding or patching operation is time consuming and may cause a defective casting if it blows in contact with molten metal.

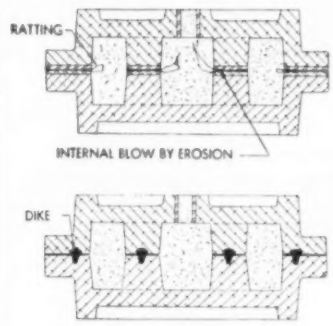


DIKE STOPS BLOW-BY . . . . The same core box is shown after installation of a dike-type seal (patents applied for). The dike conclusively eliminated blow-by with an effective, positive barrier.



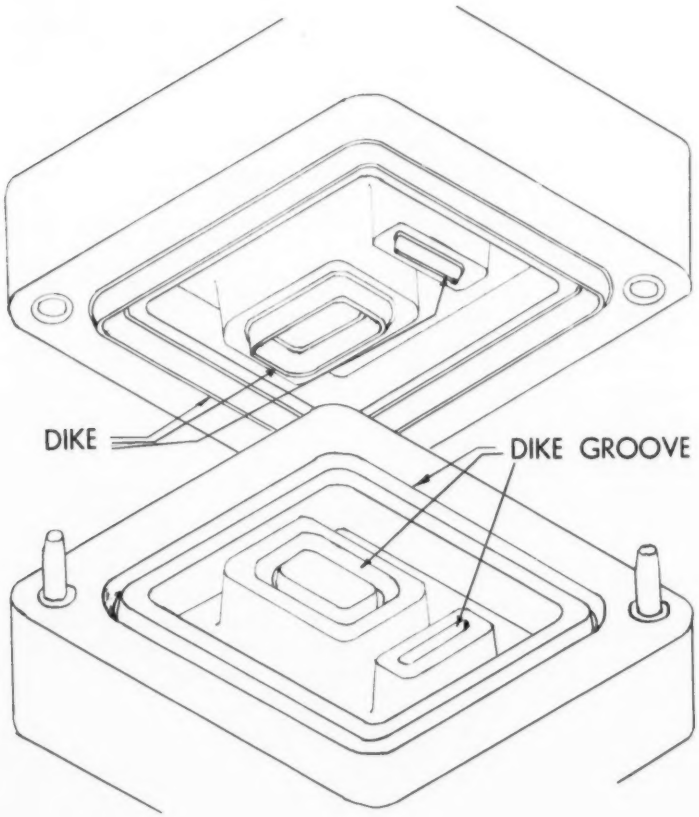
FINS ON CORES . . . . This escape of sand-laden air at core box parting also produces fins on cores.

Removal of these fins destroys the smooth, fine-grained skin on the core and exposes its coarse-grained inner structure. A core wash must then be applied to prevent metal penetration into this exposed rough surface. Considerable time is consumed by fin removal, washing and drying the wash.



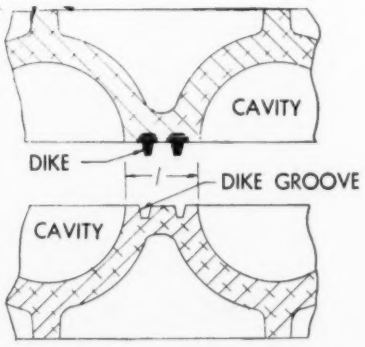
SEAL CURES RATTING.... These tests were made with the cooperation of a production foundry. In the upper figure, voids and fins at parting lines are much in evidence. Complexity of core made fin removal difficult.

The lower drawing shows that addition of dike-type seals to this box has definitely stopped piping or ratting and eliminated excessive fins by creating static back pressure when blowing core.

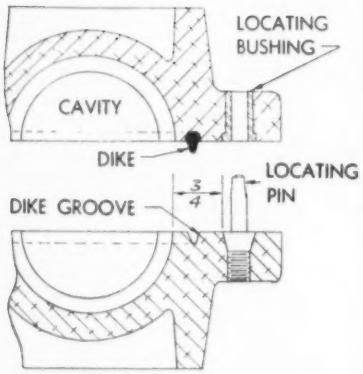


SEALING ISLANDS . . . . This experiment not only proved that each cavity should carry its own seal, but sealing should also be applied to islands and kiss-offs.

Piping and finning are better controlled this way than in the case of a single seal separating two cavities. The single dike-type seal is subjected to counter-pressures from each cavity, consequently reducing the individual cavity control.

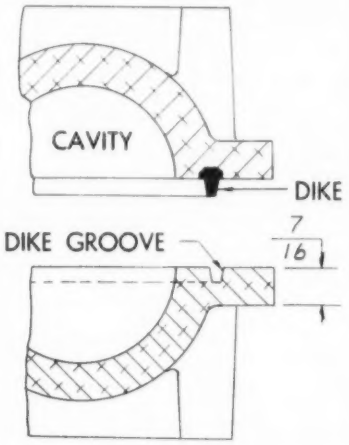


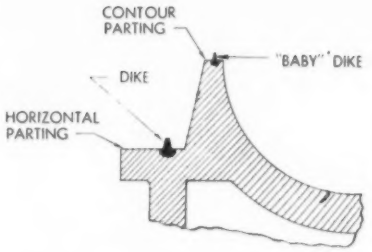
USING TWO DIKES . . . . At least 1 in. is provided between cavities for proper placement of a seal for each cavity and maintenance of metal structural strength.



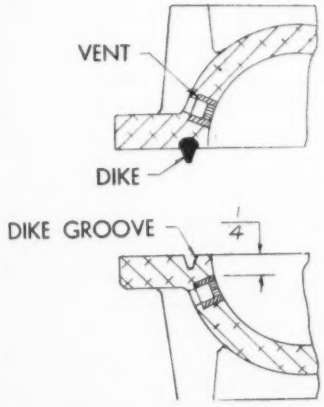
BUSHINGS AND PINS . . . . Keep locating pins and bushings back from core box cavity to allow room for the seal with seal outside bushings and pins, an escape-way is open to the destructive air and sand.

MACHINING ALLOWANCE . . . . Since the opposing faces of core boxes must be grooved, enough thickness should be provided in the flanges to accommodate this machining and still retain sectional strength.



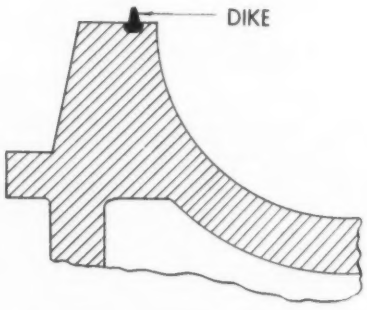


CONTOUR PARTING . . . . This parting, a two-step sweeping contour on the narrow land of upper face, dictated the installation of a small dike. Known pressures and area required the addition of a standard, or back-up dike, on the flat horizontal lower parting. This precaution insured against possible over-ride of the small dike, with loss of pressure to the atmosphere, as well as erosive action of any leakage on parting faces.

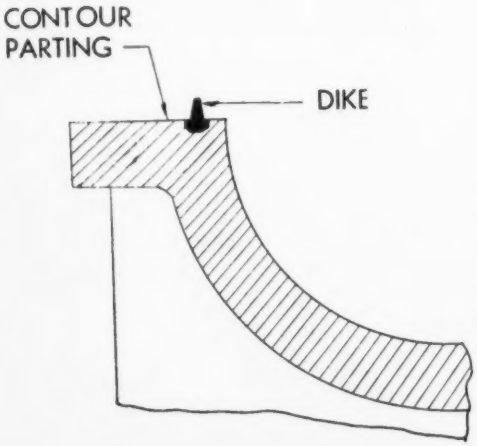


LOCATING VENTS . . . . With a dike-sealed core box, all air must escape through vents as the sand is conveyed into the cavity. Proper ratio of blow-tube area to vent area is important.

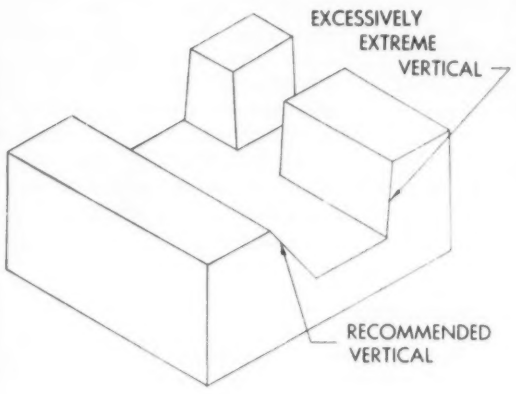
Locate vents far enough from the parting line to avoid cutting into them during machining of dike grooves.



RE-DESIGNED PARTING . . . . A more realistic approach provided a land width sufficient to receive a single, standard dike-type seal on the contour parting. No back-up seal is necessary on the lower, flat horizontal parting.



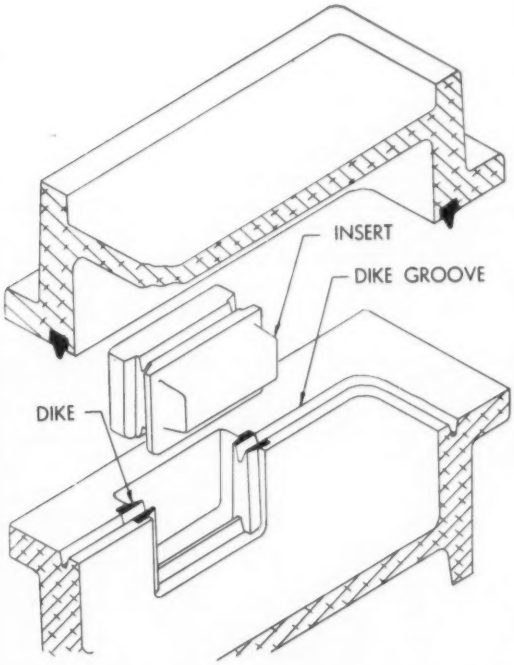
SINGLE FACE PARTING . . . . The dike-type seal frees the pattern engineer from older, more costly methods of core box construction. Double, off-set partings, representing two surfaces that must be dimensionally controlled, can be eliminated. By allowing a single face parting, following true core contours with one parting face dimension to be controlled, the cost is considerably less. With this type parting the blow machine operator can keep parting faces clear and clean of stray sand grains or foreign matter.

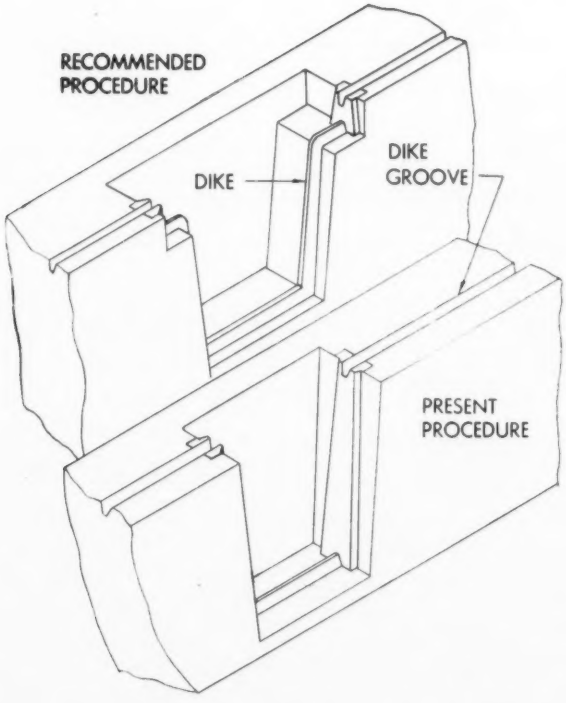


VERTICAL PARTINGS . . . . Where possible, avoid partings with extreme verticals in favor of partings with more incline. Extreme or steep verticals present machining problems in control of dike groove accuracy, especially in core boxes to be duplicated for interchangeability. Also the seal is subject to possible damage from repeated abuse while closing and separating the sections.

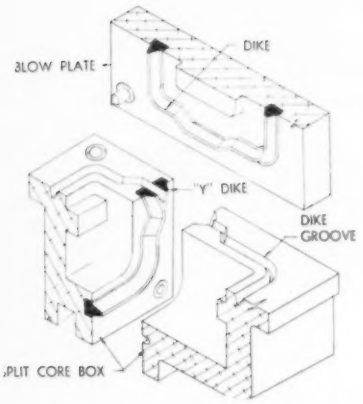
SEALING LOOSE PIECES . . . . Where loose pieces enter into the design, they can be sealed. Note that the seal in top half of box nests into bottom half as well as into the loose piece. Loose piece is sealed on both top and bottom.

The seal prevents air and sand from blowing between the loose piece and its container. Sand can cause loose pieces to stick and not only be hard to remove from core box, but lead to core damage when the core is being removed from the box.



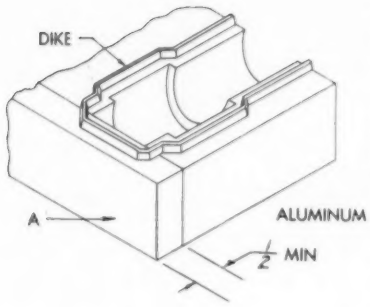


DIKING A DEEP DRAW . . . . The lower illustration shows the usual treatment of a deep draw, loose piece. Note the width of the seal necessary for proper fit and draft. The flexibility desirable in an effective dike-type seal has been sacrificed. The upper drawing is the recommended method of handling this condition. Length of the broad, semi-rigid seal has been considerably shortened and confined to the upper area of the loose piece. Below this short step a narrow, more flexible seal provides a greater length and effect, in contrast with the seal in lower illustration.



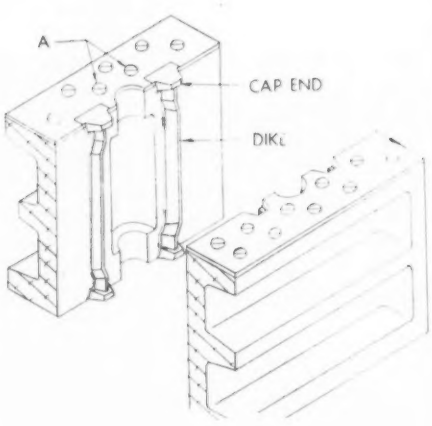
"Y"-DIKE . . . . Core boxes, with three or even more parting members or sections, multiply the possibility of blow-bys. Such boxes are costly to make and maintain; therefore they should receive every attention and consideration.

Note the "Y"-dike design that effectively blocks blow-by at all sectional partings. Research and field testing have proven it to be effective even after many months of use in production. Without diking, the core boxes needed constant repair and maintenance of partings due to blow-by.

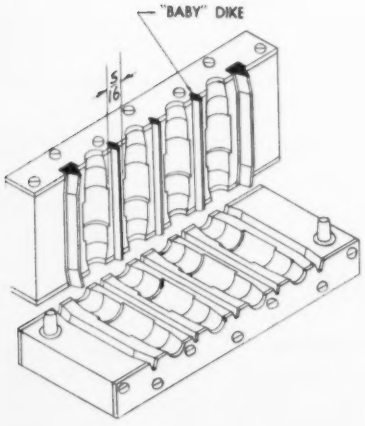


CLOSING BOX ENDS . . . . Metal plates or strips (A) used to close open ends of core boxes should be a minimum of ½-in. thick to permit proper installation of the seal. All additions to core boxes should be in tight contact, as air and sand could leak through and rapidly erode surfaces. Additions should preferably have the same metal composition as the box to which applied.

CAP END DIKE . . . . Open end boxes are usually faced with steel wear plates on both ends. Since they are blown from one end, the cap end dike-type seal serves as an excellent cork when pressure is applied, stopping off entrance of air and sand into the diked area. This additional area of seal also protects the diked ends when core box is dragged across the platen or clamping plate.

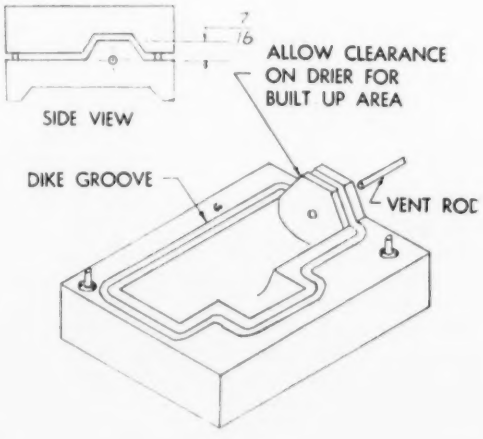


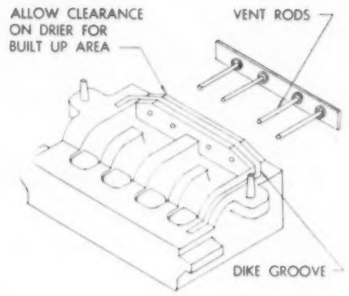
Your attention is directed to the location of facing screws shown at "A." This screw arrangement allows for additional width at the dike cap end for anchoring wear plates.



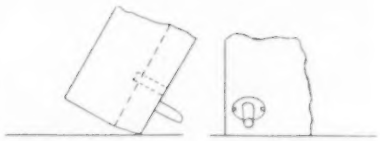
PIN CORE BOXES . . . . Pin core boxes can be effectively sealed if a minimum of 5/16-in. is provided between core cavities.

SEALING VENT RODS . . . . Where a vent rod is needed in a core box, the usual practice is to relieve the parting faces to accept one-half of the rod. This practice invites blow-by and prevents perfect, continuous sealing. To overcome this and provide an uninterrupted barrier to blow-by, an elevated build up over and around the rod is recommended.



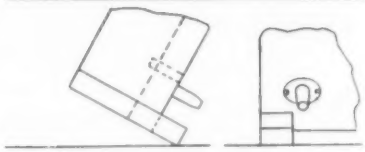


MULTIPLE VENT RODS . . . . Multiple vent rods are handled in much the same manner. If vent-rod hole becomes worn it can be repaired by installing a bushing or sleeve without interfering with the seal. The pattern engineer should allow clearance for the drier over the built-up area when pattern equipment is being produced.



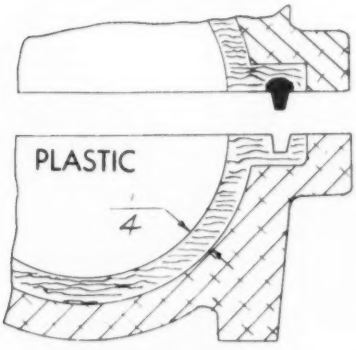
DRAGGING CORE BOX ACROSS DRIER PLATE CAUSES EXCESSIVE WEAR ON BASE AT PARTING

WEAR ON LEADING EDGE . . . . Wear on leading edge of stand-up core boxes may be caused by tipping and dragging core box across drier plate.



INSTALLATION OF ELEVATOR BARS PREVENTS WEAR ON BOX

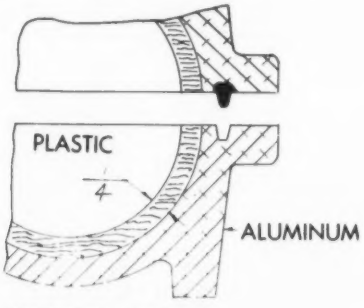
ELEVATOR BAR . . . . This problem is solved by using an elevator bar. Tipping elevates the leading edge off the drier plate and reduces excessive wear.



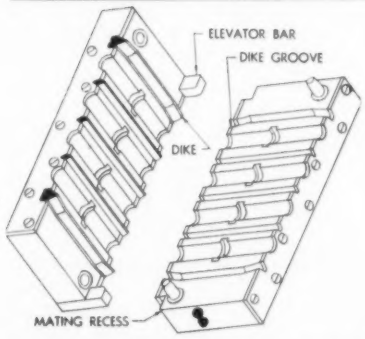
POSSIBLE METHOD

PLASTIC-LINED BOXES . . . . Plastic-lined core boxes should be constructed to allow location of the seal in the metal section of the core box. Application and molding of plastic liner to core box shell is done after the seal has been processed.

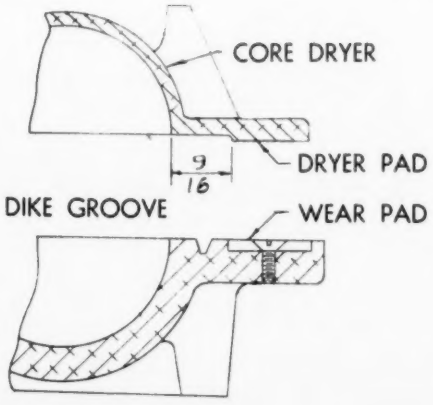
Locating seal in metal shell (below) allows pattern engineer to cope with changes or damage requiring removal of plastic. If original design placed seal in plastic (left), seal would have to be removed and groove recut.



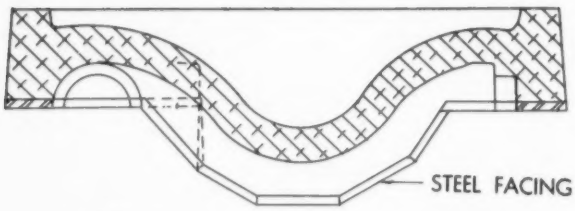
PREFERRED METHOD

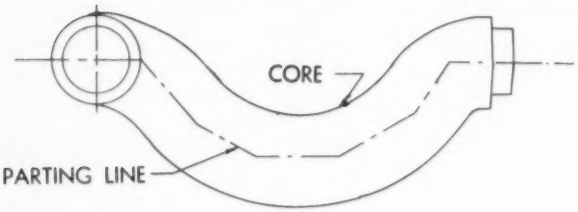


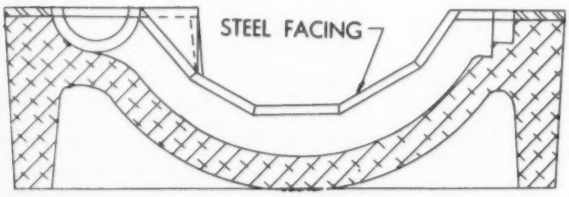
ELEVATORS PROTECT SEALS . . . . This multiple cavity core box is equipped with elevators which also provide protection for the seal.



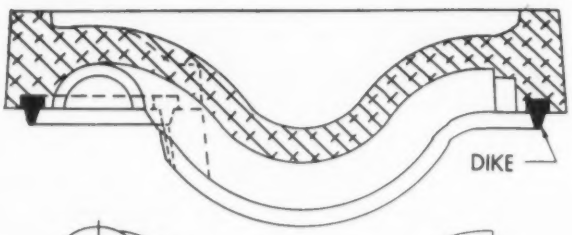
WEAR PADS . . . . If core drier equipment is used, replaceable steel wear pad inserts should be installed on the face of core box half that is to contact the drier. The pads absorb the peening action from repeated banging and closing. Place the pads well away from the dike grooves to eliminate any chance of cutting into them when machining the grooves. The pattern engineer should also provide matching pads on the drier pattern when the master pattern is being made.

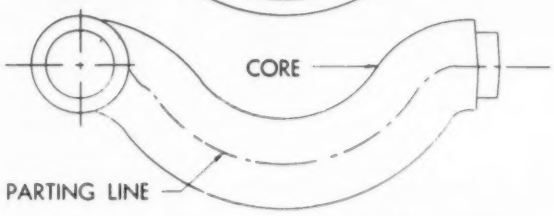


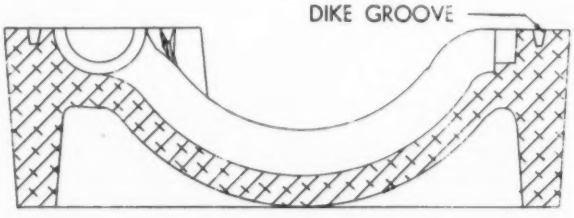




FACING BOXES . . . . Facing boxes with brass or steel is costly and limits the equipment by requiring contour partings with numerous angular flat plane faces. Each corner or section represents a future blow-out problem for repair.

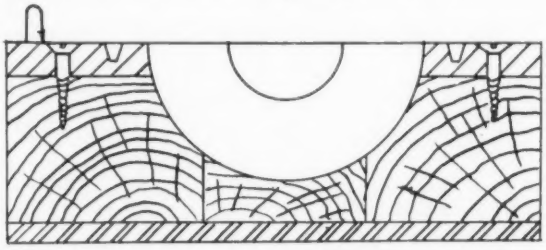


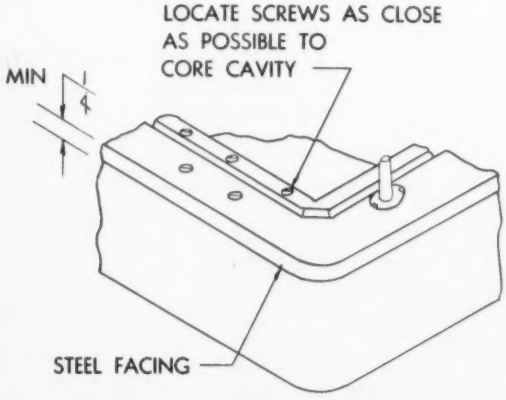




NO FACING NEEDED . . . . Since dike-type seals eliminate any need for applying steel or brass facings to resist erosion, smooth flowing natural parting contours are possible.

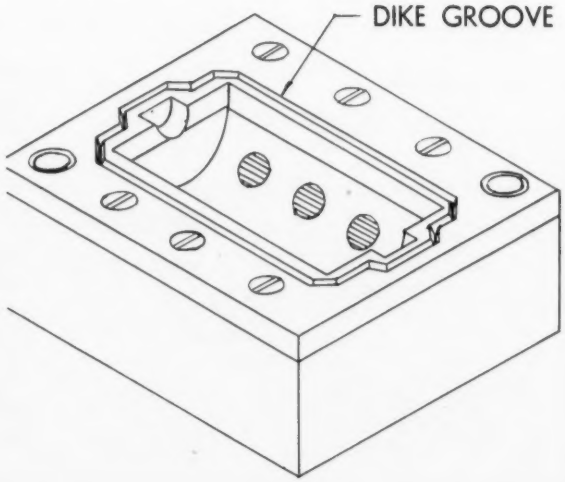
FACING WOOD BOXES . . . . Partial facing, preferably aluminum, is needed on wood blow-in core boxes. This facing, at least ¼-in. thick, is removed from core box when seal is being installed so as to avoid subjecting the wood to various stresses.





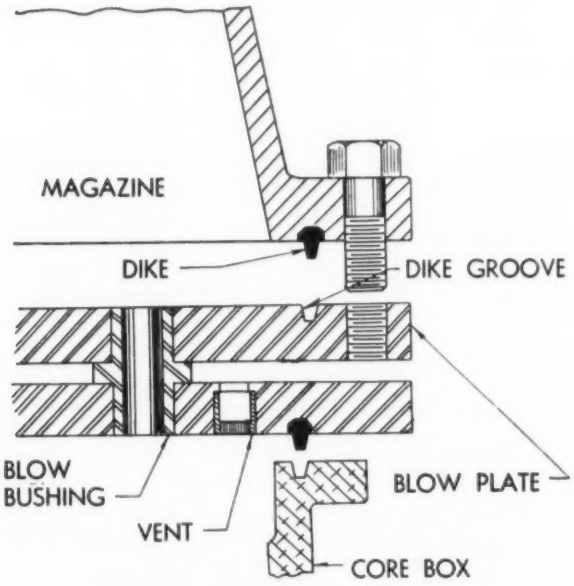
ATTACHING FACING . . . . Where steel facing must be used to reduce wear or friction, try to locate screws along the cavity edge and outside the dike area.

Facing material at least ¼-in. thick is used to prevent cutting through when installing the seal.

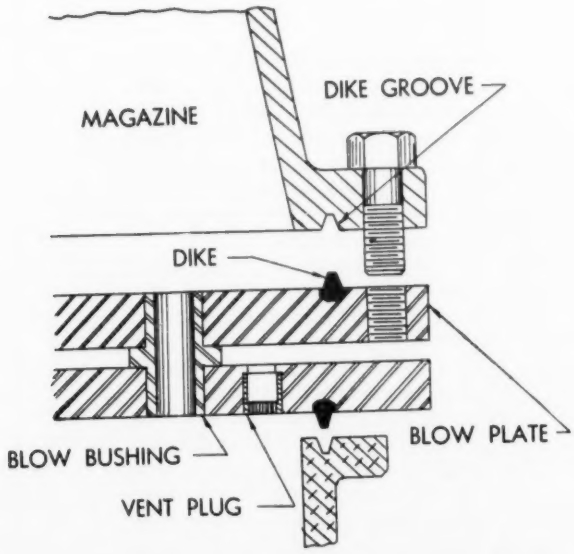


Now that it has been demonstrated how blow-by can be controlled in core boxes it is natural to ask what can be done about the leaks observed on the blow plates and magazines?

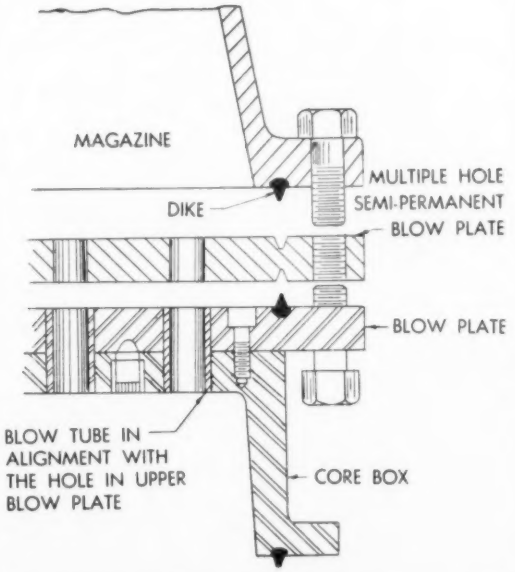
Sealing of these parts not only eliminates erosive wear but provides an additional bonus in the form of safety. The 1957 edition of the American Foundrymen's Society, RECOMMENDED SAFETY PRACTICES FOR THE PROTECTION OF WORKERS IN FOUNDRIES suggests the use of a dike-type seal to prevent blow-outs that may injure operators.



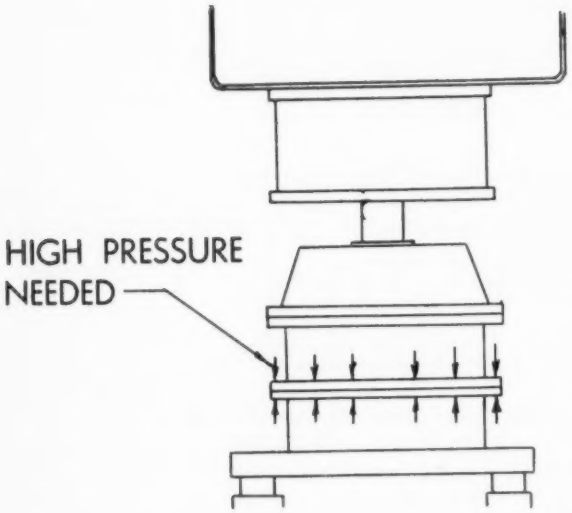
MAGAZINE AND BLOW PLATE . . . . The illustration shows how to install a seal between magazine and blow plate. Dike-type seals allow blow plate to be bolted in tight abutment to the magazine. A flat gasket would take repeated shocks from clamping or closing cycle and in time be damaged and blown-out.



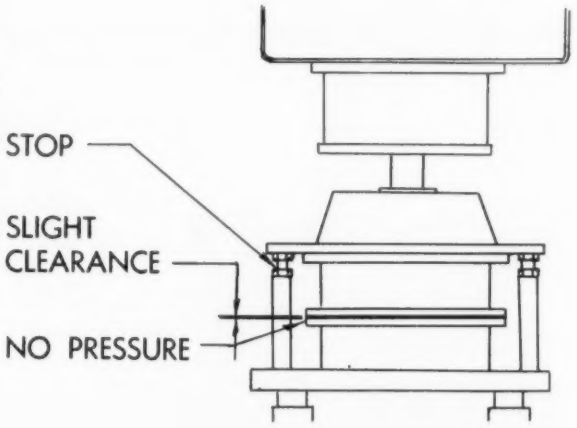
REVERSE GROOVES . . . . A variation shows the dike seal located in both sides of the blow plate and grooves in the magazine and core box.



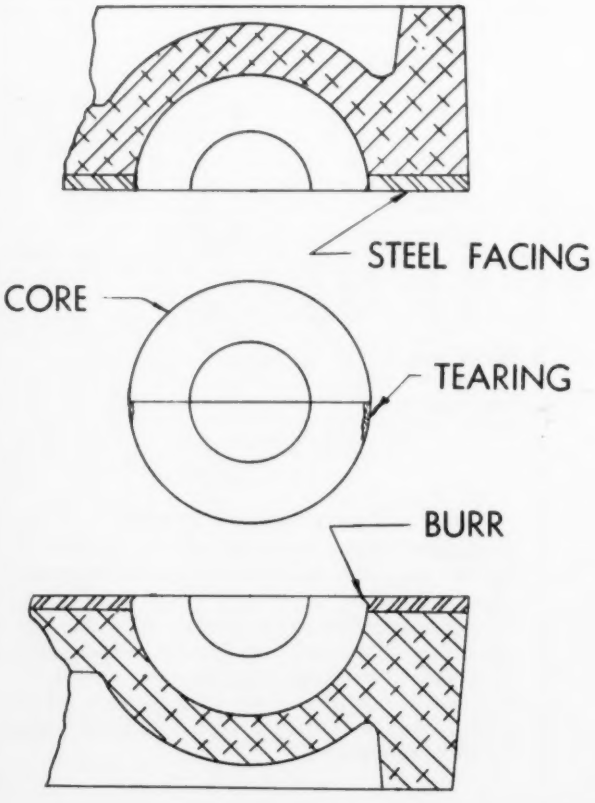
SEMIPERMANENT BLOW PLATE . . . . The illustration shows that a seal can also be located in the magazine and grooves in a semipermanent multiple-hole blow plate. The blow plate, bolted to core box, is equipped with a standard molded seal that conforms to groove in the semipermanent blow plate. Similar type core boxes can also be equipped in the same manner. Down time is thereby reduced when changing boxes for short-run orders.



LOWER CLAMPING PRESSURE . . . . In normal practice extreme clamping pressures are used to maintain abutment of core box faces and prevent blow-by. Need for this high clamping pressure directly on core box faces is eliminated when dike-seal boxes are used. The dike does not depend on tight abutment of box faces to prevent blow-out; instead the flexing action of the dike will establish a continuous seal that prevents escape of air and sand. Faces must be properly aligned and joined.



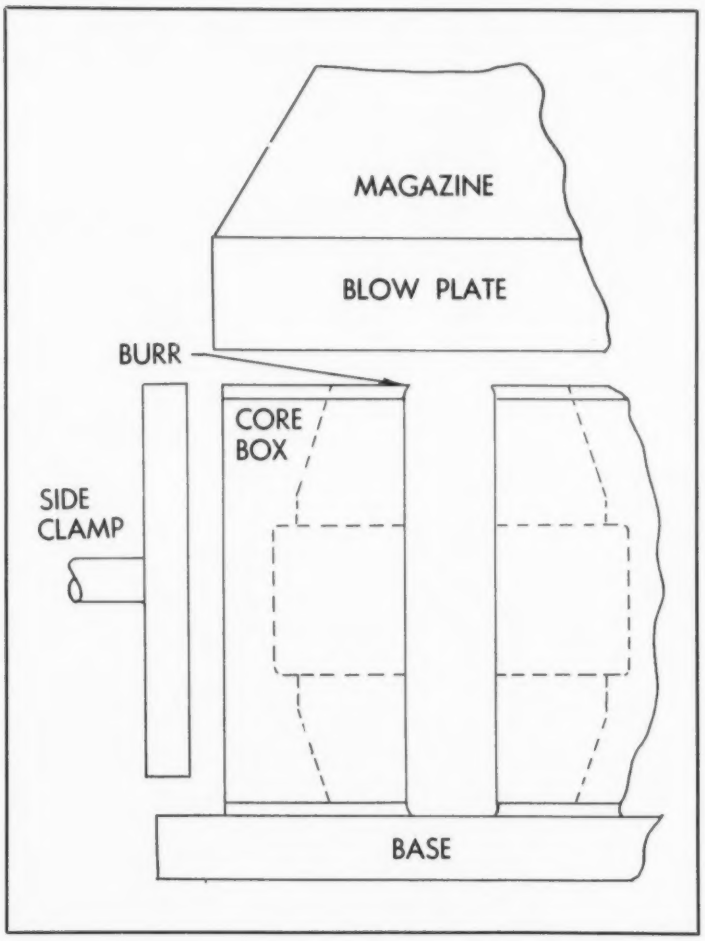
LESS DAMAGE . . . . Proper application of rails and stops to absorb and reduce the shock of closure and clamping will prolong the service life of your equipment. One conception of the application of these stops is illustrated here. Slight clearance of partings insures against damage to core box facing.



AVOID BURRS . . . . Burr formation caused by excessive and repeated clamping will prevent a core box from closing, thereby affecting the quality and accuracy of cores.

This type of burr or lip formation results from repeated closing with excessive clamping pressures directly upon the core box. The underlying reason for using these destructive pressures is an attempt to exert enough force on the parting surfaces to prevent blow-by. As leaks continue to develop, closing pressures are increased.

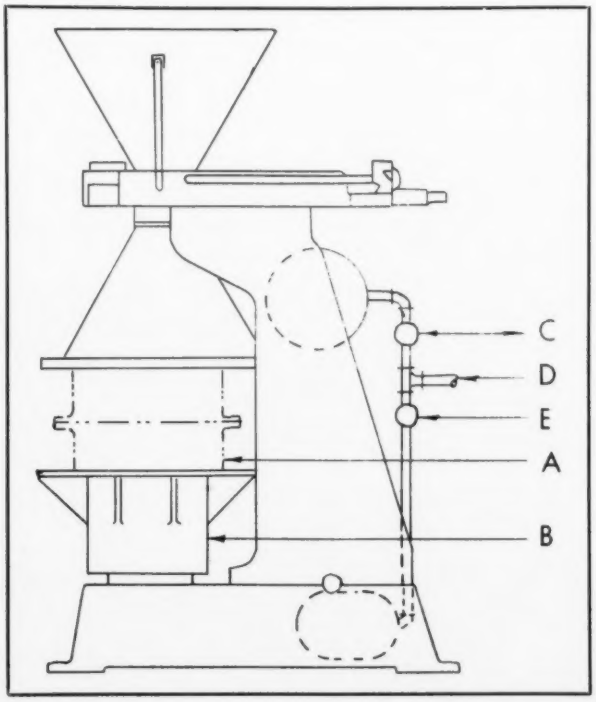
Increasing pressures force the steel facing outward, overhanging the parting faces, thus preventing metal to metal mating of these surfaces. This not only leads to the production of piping holes, fins and blow-by, but defeats the purpose for which the pressures were applied since it prevents the proper closing of the core box.

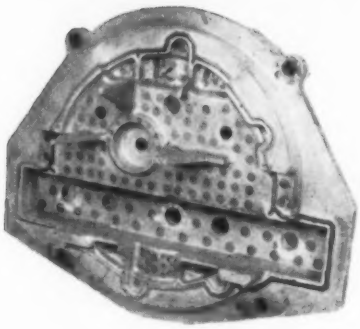


CORE DAMAGE . . . . Serious damage to core boxes often results from extreme clamping pressures. Core distortion and tears, as well as constant repair or destruction of box, are the end results. The adjacent illustration demonstrates the damage a core box can sustain from this cause. Note the overhanging lip formed in this steel faced unsealed core box.

PRESSURE REGULATION . . . . Too often core blowers are used with oversize core boxes, see A. Limits of the machine are judged by diameter of the clamping cylinder, B. As a result of this condition, parting faces separate on the blow cycle, permitting blow-by and excessive fins on cores. The writer advocates use of pressure regulators at C and E. Sufficient line pressure is needed at D to permit adjustment of blow pressure on C regulator while E regulator is adjusted to provide additional air pressure so box will not blow apart during blow cycle.

It is not to be construed that the author recommends the use of larger core box equipment on a unit exceeding the manufacturer's specifications and recommendations for the operation of their equipment.

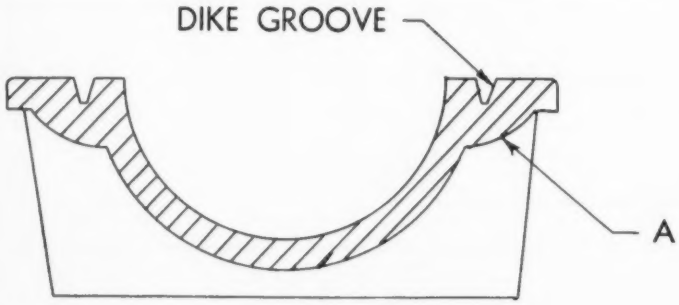




MECHANICAL CLAMPS . . . . Mechanical clamps may assist in locking the partings together. This method eliminates the possibility of separation as well as any need for pressure ratio adjustment in changing over to boxes of excessive cavity areas. Mechanical clamps also permit use of smaller capacity cylinders to raise the lower half of the box. Smaller air cylinders will effect substantial savings in air-compressor operation.

BLOW-IN DRIERS . . . . With proper control of blowing and clamping pressures, as well as the use of rails or stops for absorption of clamping shocks, blow-in driers may prove useful in your operations. Blow-in driers equipped with dike-type seals have excellent performance reports.

Design of the drier is important since the groove will be cut into the master pattern and cast from this into production units. The patternmaker must provide adequate sectional depth at "A" in the master pattern so drier pattern will not be weakened by machining of dike grooves. The seal will be installed in the blow half of box, using one of the production driers to process and form the dike. Savings that can be realized in reduction of operations in coremaking by this method are readily apparent.



BLOW IN DRIER

FOUNDRYMAN IN THE RING

Action-packed championship bouts provide thrills for Kessler

Many foundrymen have hobbies that represent impressive accomplishments. Such absorbing interests bring enjoyment to leisure time and sharpen minds and bodies for the work-day world. We hope that you will enjoy this brief sketch of a foundryman and his hobby. — Editor.

HARRY KESSLER /
Sorbo-Mat Process Engineers, St. Louis

Kessler moves in as Moore is floored by Rocky Marciano.

"Eight—nine—ten"

Numbers even the smallest child knows. Yet those numbers could mean fortune or defeat to a boxer, for they are the finish of a count that marks a knockout. These numbers are also the wrap-up of an evening's activity for that third man in the ring—the referee.

Counting to ten, though, is not the only requisite of a referee; judgement, integrity and a sense of justice play a large part.

When I was given the nod and told I was to referee the Rocky Marciano-Archie Moore fight, one of the best title matches ever contested in the heavyweight division, the assignment seemed to be a dream come true; a hope that I had carried with me ever since I was a young man just graduated from the Missouri School of Mines and Metallurgy.

I think it really began when our family received a set of boxing gloves as a gift from ex-boxer Billy Cole. This Canadian featherweight had moved in next door to our home on Cass Ave. in St. Louis and proceeded to give the boys in our family lessons in boxing. While Cole's instructions were mainly for our development and entertainment, they were good enough to advance three of the Kessler clan into the prize-ring.

Boxing helped put me through school at Rolla where I boxed as an intercollegian and acted as the boxing coach. In four years of competing for the Missouri School of Mines, I was fortunate enough to be undefeated.

Upon returning to St. Louis after graduation I found employment with the American Manganese Steel Co. as melter, and at nights instructed boxing classes at the local YMCA. Under the guidance of Harry Sharpe, a great boxing figure, I became a referee and state official and was called upon to officiate at matches all over the state. About this point in my life I became superintendent of a large iron foundry and I hung up my gray flannel uniform.

However, once I became more firmly established in my foundry work I discovered that an integral part of my life seemed to be missing—my hobby, something which every man needs for his relaxation and well-being.

Any Friday evening that I'm called upon to referee a boxing bout, be it in New York's Yankee Stadium, Madison Square Garden, Polo Grounds, or Syracuse's War Memorial Auditorium, or at the Buffalo Auditorium or even at America's oldest boxing arena, New York's St. Nicks, millions of fans are glued to their TV sets across the country. All eyes are focused on the hands of the contestants, as well as on the movements of the referee.

Although the Marciano-Moore fight was one of the most colorful, it was not the first championship bout I had been called upon to referee. In 1950, I worked a title bout between Willie Pep and Charley Riley in St. Louis, and another championship bout, in my home city, was the Joey Maxim-Archie Moore go. My first championship bout in New York, however, was another featherweight title match —Sandy Saddler and Teddy "Red-top" Davis. But, it was a bout in Syracuse that brought me my biggest ring thrill.

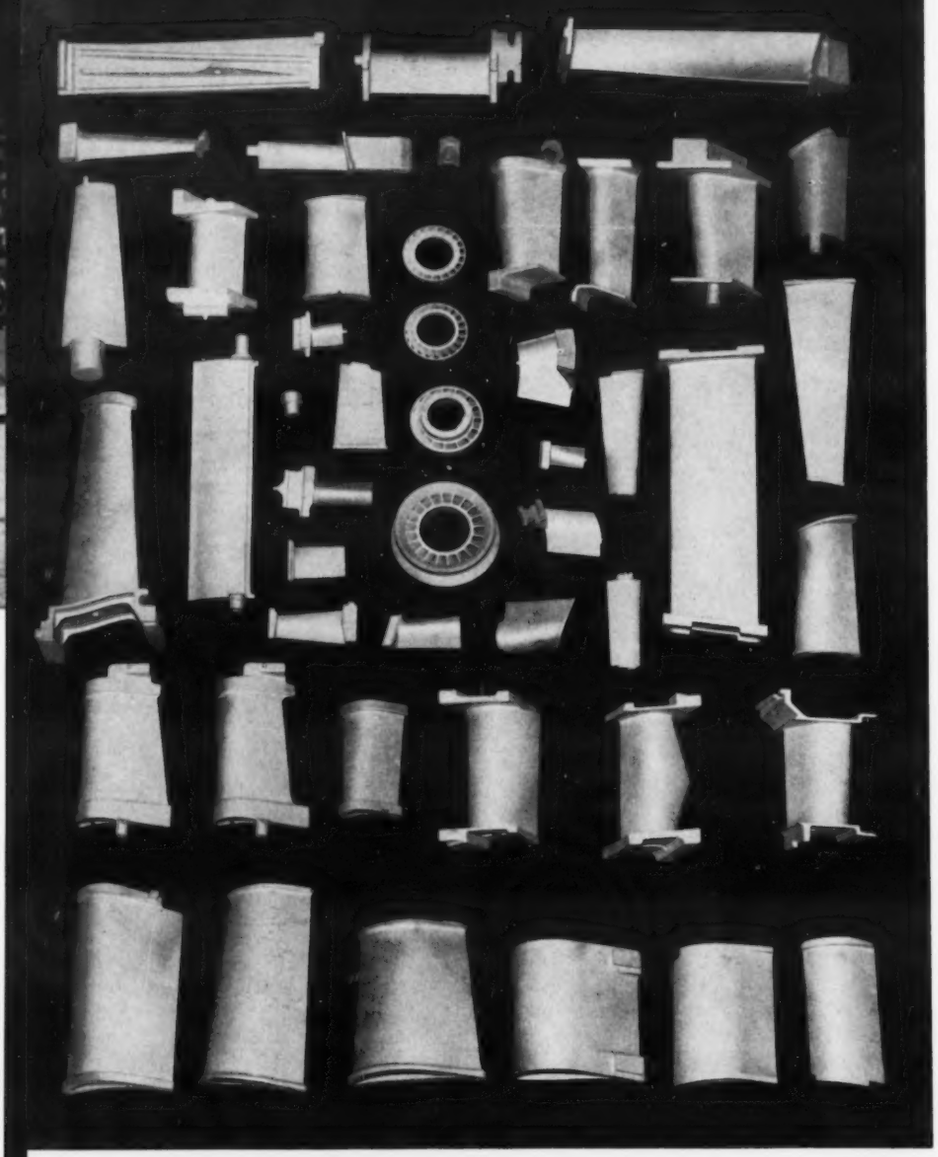
It was the evening when Carmen Basilio won the world welterweight title from Tony DeMarco in a savage slugfest that had the fans across the wide span of the United States talking for days on end. It was the kind of a fight that you would pay fifty dollars to witness, if someone could just look in the crystal ball and foretell what was to take place.

In my years refereeing under the jurisdiction of the New York Athletic Commission, I have been fortunate in officiating at some of the most important bouts. I worked Floyd Patterson's last bout before he defeated Archie Moore for the heavyweight title. While my decision against Patterson in favor of Tommy "Hurricane" Jackson did not meet with the approval of most of the working press, I was happy to learn through my travels and the mails, that a majority of the fans throughout the country agreed with my verdict.

This brings me to a question asked many times, "how do I score a fight?" The length of a round is divided into minutes—three. While I'm refereeing I take mental notes as to each contestant's progress during those minutes of fighting. In my opinion, the boxer who does most of the work in that time—three minutes—is entitled to the round, not the boxer who is a periodic performer, a clock watcher so to speak, who makes a closing rally spaced about a minute or thirty seconds at the end of the round. My vote is based on three marks—effective aggressiveness, clean hitting and ring generalship.

In New York, and now in most of the states, they have score cards on which you mark your round findings and, at the duration of the bout, total them for your winner. When I first started to officiate I placed the number of pennies in my watch pocket as there were rounds to box. At the end of each round, I would shift one penny (a gold-plated Indian head) to either the left or right hand side trouser pocket depending on which contestant won the round. At the end of the bout, I would count the number of pennies in each pocket. Some figured I was arriving at the decision by means of calculus but I was doing no such thing.

While the work of refereeing a boxing match isn't too strenuous, it is indeed necessary to be in top physical condition. You can imagine how you'd feel going ten to fifteen rounds, always on the move, if you didn't do a bit of exercise between calls or watch your diet at meal times.



JET AGE CASTINGS by MISCO

Super-duty precision castings meet the demands of advancing technology

The jet age has not only broken through the sound barrier, but also through the barrier of prejudice against the use of castings in aircraft. One of the companies that has done much toward proving the superiority of castings in aircraft applications is the Misco Precision Casting Co. in Muskegon, Mich.

Misco is a large supplier of precision castings for the gas turbine of the J-57 jet engine. From a small nucleus of only 26 employees in 1948, the company has grown to 1380 workers occupying 150,000 sq ft of manufacturing facilities with a capacity of producing $21 million of castings per year. In a $100 million industry this makes Misco one of the three largest producers of investment castings in the world.

An experimental program is now in progress within the company and in cooperation with a major automotive concern to develop low cost turbine elements for a car engine. Volume production of this item is still many years in the future.

Photographs on these pages show a number of the operations required to make precision castings in the Muskegon plant. Two new processes, Mono-Shell and Accra-Core, are depicted.

This representative collection of cast blades and vanes for gas turbines demonstrates the variety of difficult shapes which are being produced daily at Misco.

Automatic wax injection machines are key to mass production of patterns.

Delicate female touch and patience is required to weld assembly of patterns to wax or plastic gating system.

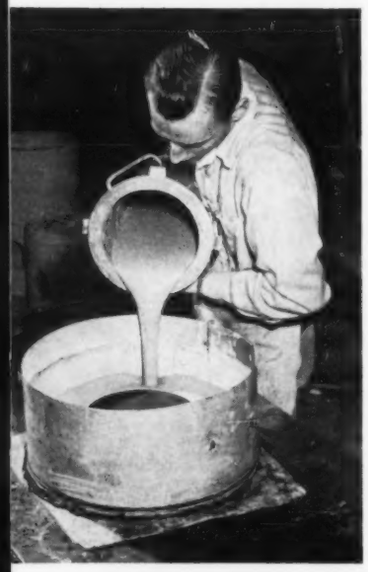
Pattern cluster is dip-coated with a silica flour slurry and stuccoed with coarse sand.

Mono-Shell process covers wax cluster with thick ceramic shell mold needing no back-up material.

The thick ceramic shell of the Mono-Shell process is formed by a series of dip coatings applied to wax or plastic clusters.

Between each successive dip the Mono-Shell is stuccoed with coarse refractory.

Mono-Shell mold has been rapidly fired to high strength and clamped to furnace for pour.



Accra-Core process uses ceramic cement poured over precision patterns.

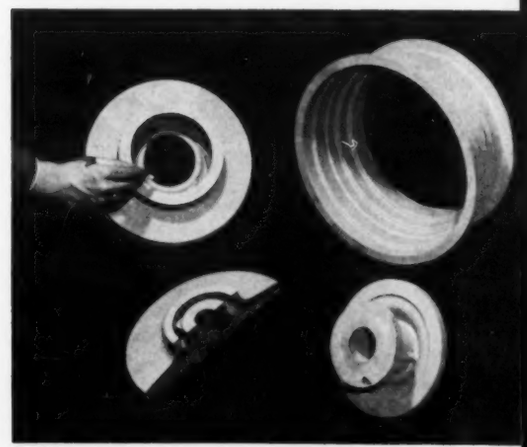
Accra-Core molds and cores are heated as high as 1700 F to develop superior properties.

Accra-Core process bridges gap between investment and sand casting. Suitable for stainless steel casting.

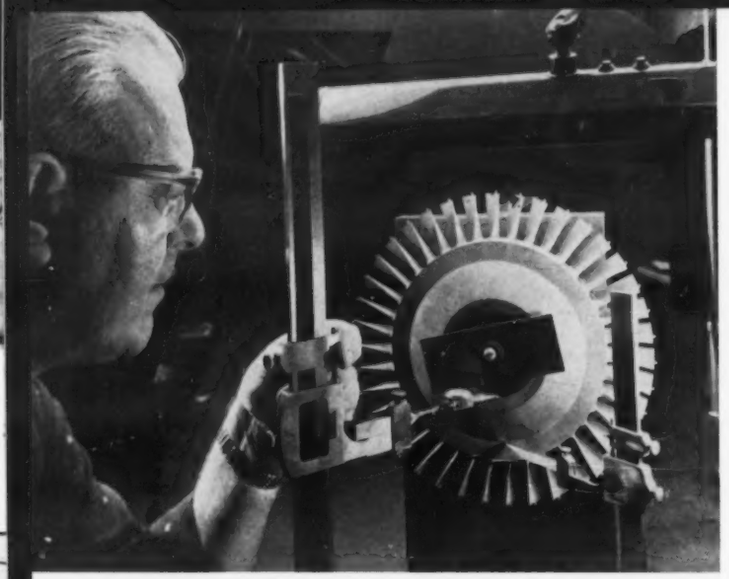
Up to 150 lb of steel have been poured into these molds producing boiler feed pumps, turbine castings.

In conventional "lost wax" process flasks are filled with investment material and vibrated.

Molds are fired above 1600 F to burn-out wax and cure investment; metal is poured in mold; shakeout shown.



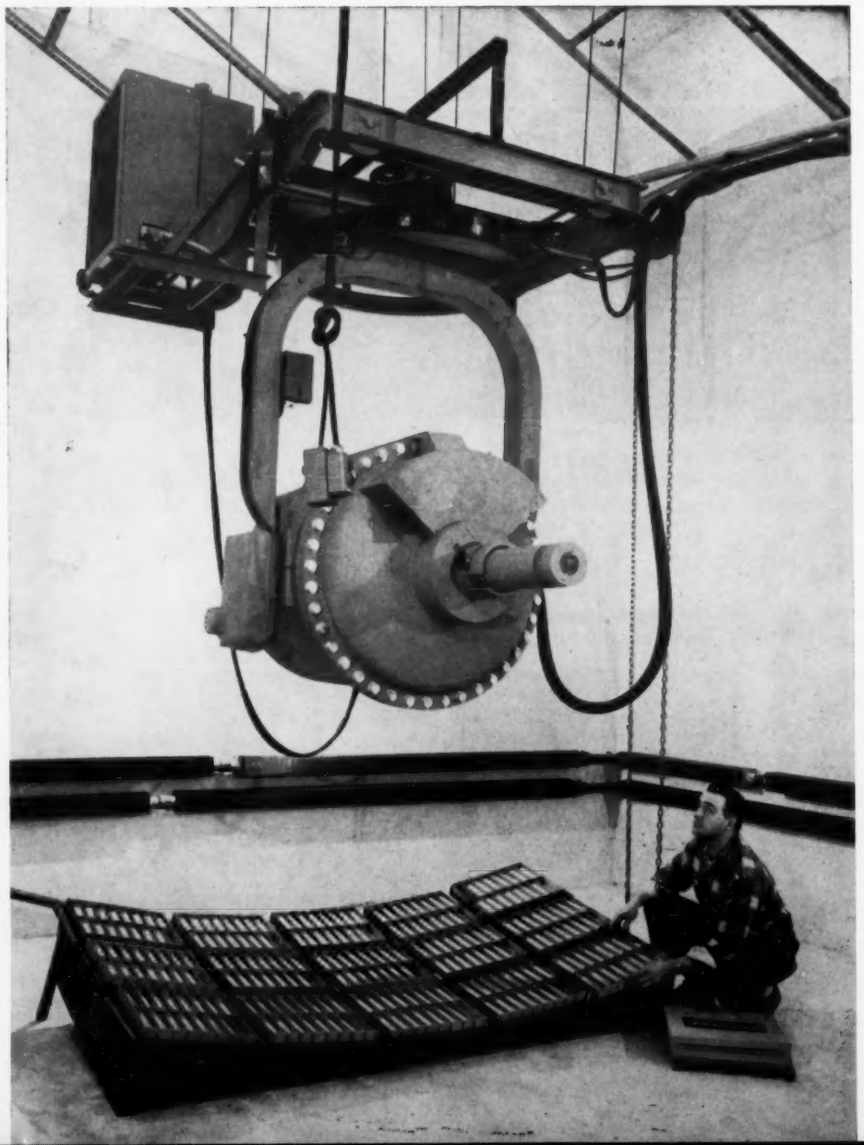
These castings made by the Accra-Core process are accurate to 0.007 in./in. with 150-200 RMS finish.



Inspector checks experimental automotive turbine wheel.

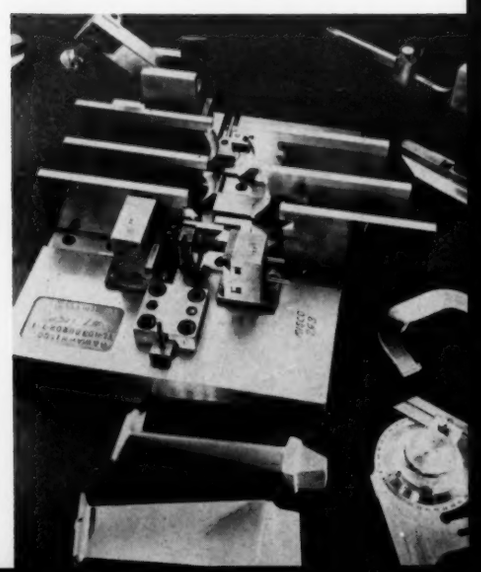
Airfoil shapes must pass 100 per cent radiographic inspection.

Optical comparator is used to check accuracy of airfoil shapes and to detect wear or improper adjustment of checking gauges.



New million volt x-ray unit in position to radiograph 240 airfoil castings simultaneously. Large machine penetrates heavy sections.

Three-section guillotine-type gage is used to check the bow and contour of airfoil casting.



MORE TRI COURSES SCHEDULED . . .

TO TAKE CARE OF REGISTRATION OVERFLOW

A complete sell out of all courses sponsored by the AFS Training and Research Institute has led to the rescheduling of several. Repetition of the Industrial Engineering Course at Marquette University, Milwaukee, has been set up for October 7-11 and the Cupola Melting of Iron will be repeated January 27-31 in Chicago. *The second series of both courses are already oversubscribed.*

Plans are being drawn up to present these two courses the third time and add a number of entirely new subjects to the Institute curriculum for 1958.

The TRI has announced that the Northwestern University has recently donated to AFS all its foundry laboratory equipment. Included was equipment for sand handling, molding, mulling, melting, sand testing, and dust collecting. The melting equipment included an indirect arc furnace and a gas-fired crucible furnace.

National Engineering Co. and Detroit Electric Furnace Div., Kuhlman Electric Co. have supervised the dismantling of the equipment and delivery to storage.

September Courses

September was "back to school month" for over 160 foundrymen attending three different practical courses—Sand Testing, Sand Control for Shop Operations, and Industrial Engineering. As of September 1, enrollment for all TRI courses totaled 350 from 24 states, plus 27 from Canada and Mexico.

The men attending the Sand Testing Course, August 19-23 and September 9-13, at Rackham Memorial in Detroit, were given a special bonus in the form of an evening tour through the Cadillac Foundry, GMC. With the foundry in full operation on the second shift, the men had an opportunity to see the Cadillac automated sand-mixing installation, a boring injector on the cupola, and new core-making equipment being readied for the 1958 model engine. Hosts to the touring group were C. W. Hockman, foundry superintendent, C. W. Yaw, assistant superintendent, and L. W. Thayer, assistant superintendent.

The week-long sand courses held in Detroit have benefited materially from the untiring assistance of Jess Toth, Harry W. Dietert Co. Mr. Toth very kindly assumed many of the details on arrangements and saw to it that the visiting foundrymen felt at home in the motor city.

With one instructor assigned to four students, personalized instruction has guaranteed every man in the Sand Testing course a thorough understanding of the subject.

The instructors who made possible the quality and quantity of teaching provided at the Sand Testing courses were:

H. W. Dietert, Harry W. Dietert Co.
V. Rowell, Harry W. Dietert Co.
R. Daksiewicz, Harry W. Dietert Co.
H. J. Jameson, Harry W. Dietert Co.
W. H. Buell, Aristo Corp.
D. R. Chester, Archer-Daniels-Midland Co.
N. Thorrat, Archer-Daniels-Midland Co.
A. Clem, American Colloid Co.
T. V. Linabury, National Engineering Co.
A. H. Zrimsek, Magnet Cove Barium Corp.

AFS Institute Courses

No. 3-B . . Industrial Engineering
October 7-11, 1957

No. 4-A . . Advanced Sand Technology
November 4-8, 1957

No. 5-A . . Cupola Melting of Iron
December 2-6, 1957

No. 5-B . . Cupola Melting of Iron
January 27-31, 1958

Cadillac Foundry was host to the TRI students and instructors who made an after-class visit to see a modern foundry in operation.

Banquet affords students and instructors an opportunity for relaxation and fellowship. J. H. Schaum, editor of *Modern Castings,* was the evening's featured speaker.

Add Life, Cut Cares, Use CARBON REFRACTORIES In Cupola Construction

G. B. TATUM /
National Carbon Co.
Cleveland

Carbon blocks resist slag attack, have high strength at elevated temperatures

Refractory maintenance problems in your cupola may be solved by switching to carbon bricks and blocks. Carbon refractories are recommended for lining cupola wells, tap holes, and slagging troughs. Resistance to attack from acid and basic slags, low coefficient of thermal expansion, and high strength at elevated temperature account for the growing popularity of carbon in cupola construction.

Natural graphite and manufactured graphite are forms of carbon with dissimilar properties. Natural graphite is found and mined in many parts of the world. Manufactured or artificial graphite is obtained by the graphitization of molded and preformed carbon shapes under controlled conditions in an electric furnace.

The different forms of carbon may vary widely in appearance and character. The gem diamond is extremely hard, white, and transparent. Graphite is soft, black and opaque. In the form of coal and coke carbon is a fuel. In other forms, when exposed to proper atmospheres, it serves as an excellent refractory.

Manufactured carbon shapes fall into broad classifications—carbon and graphite. In the discussion to follow, by the term "refractory carbon" or "carbon" the amorphous form of carbon will be understood unless graphite is specifically designated.

Carbon refractories are available in the form of standard brick shapes, ramming pastes, and carbonaceous cements. Fabricated furnace-liner sections and other machined blocks are made from standard furnace-liner stock which is available in various sizes up to 24 x 30 x 108 in. long.

Properties

Carbon possesses a number of unusual and highly desirable physical characteristics which explain its usefulness as a refractory material.

- Chemically neutral and resistant to both acids and bases.
- Low coefficient of thermal expansion and contraction.
- High mechanical strength at elevated temperatures.
- High resistance to thermal shock and spalling.
- Volume stability under load.

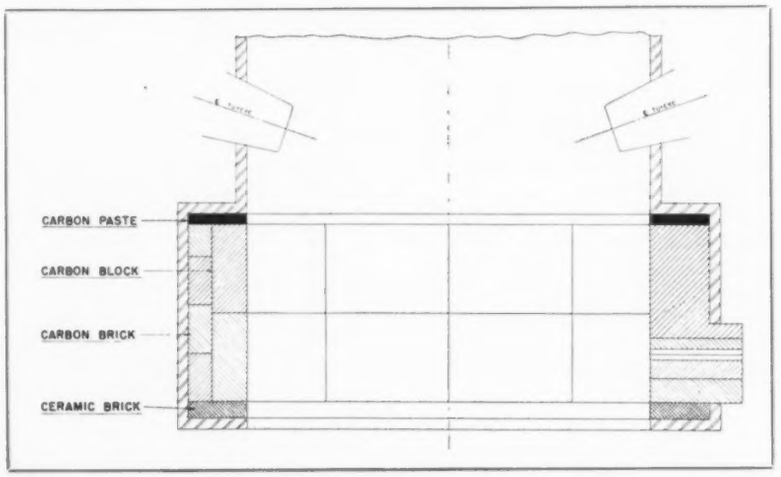
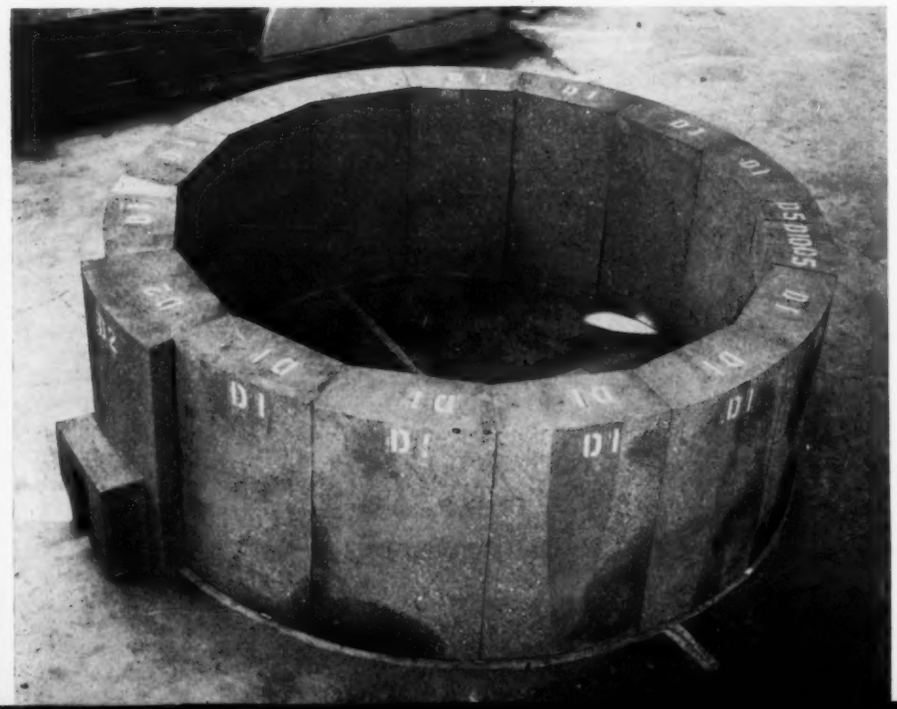


Fig. 2 . . Recommended construction for carbon lining the well-zone.

Fig. 1 . . Cupola well-zone lining of large carbon blocks has few joints.



Uses

Carbon refractories are employed by aluminum industry for lining aluminum cells or "pots"; by the steel industry for blast furnace linings and ferro-alloy furnace linings.

In the foundry, carbon refractories are used as a wash for molds, troughs, ladles, spouts, liners, etc. More recently, carbon blocks, brick, rods, and paste have come into use for cupola linings, breast blocks, slag dams, chills, and cores. Graphite injection tubes are used for the addition of carbon, desulphurizing agents, and up-grading material into molten metal.

Cupola Refractories

Carbon was first used as a cupola lining because of its resistance to highly corrosive slags. Unattacked by either acid or basic slags, this flexibility is frequently advantageous. Its low coefficient of thermal expansion and contraction and its resistance to spalling when subjected to severe thermal shock, have been recognized as added advantages. Carbon linings have been applied chiefly in the well zone, breast, and front slagging trough.

Cupola Well Zone Linings

Four general types of carbon well-zone lining constructions are used.

- Type 1 (a) Working lining consisting of large carbon fabricated blocks.
  (b) Back-up lining using standard brick shapes, etc.
- Type 2 (a) Working lining con-

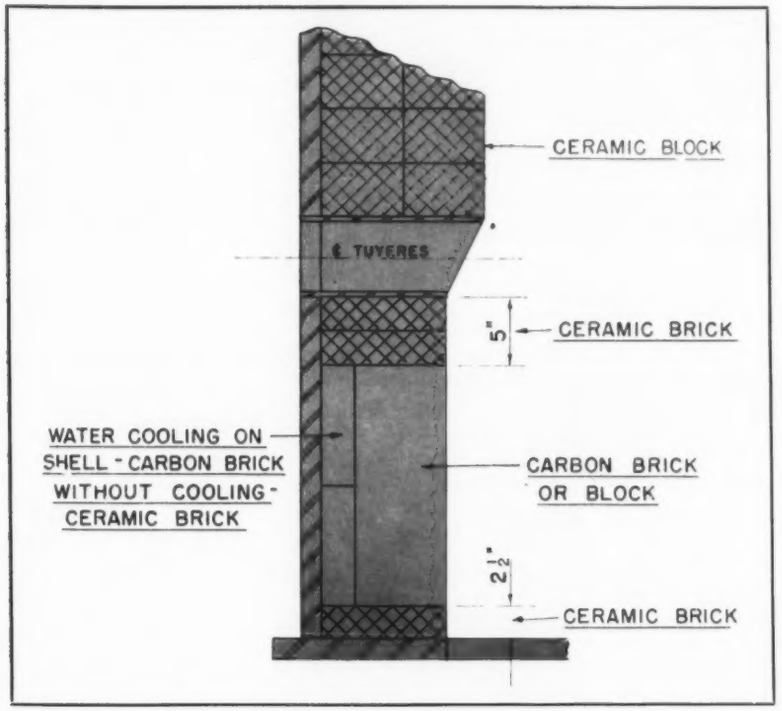


Fig. 3 . . This construction uses ceramic brick for thermal insulation.

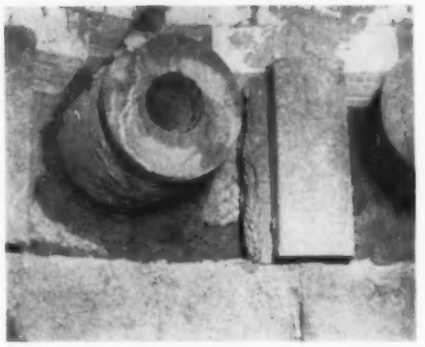


Fig. 4 . . Carbon blocks are in good shape after 55 days of steady melting.

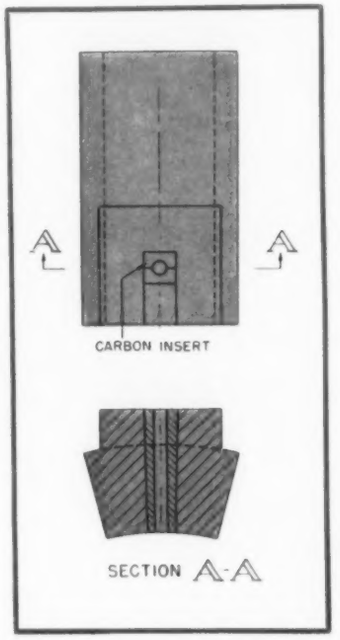


Fig. 5 . . Renewable tap hole in breast block permits replacement of insert.

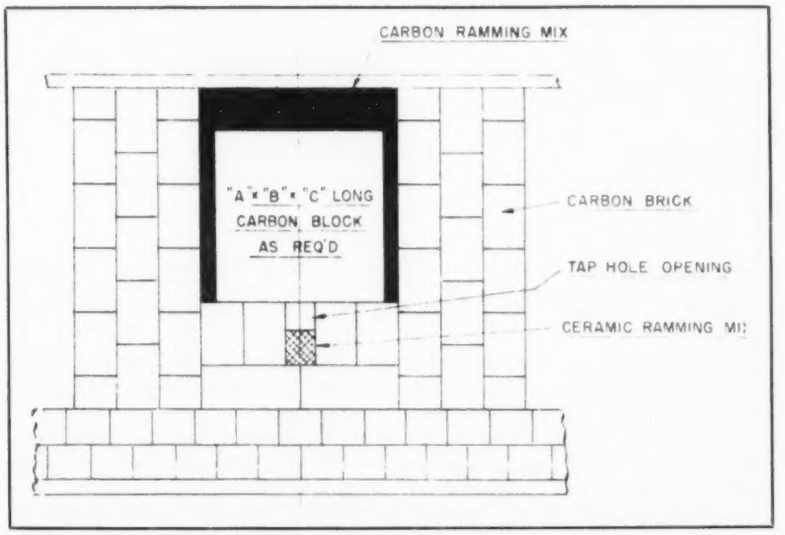


Fig. 6 . . Carbon block used on top of tap hole to resist slag attack.

sisting of large carbon fabricated blocks against the shell. No back-up lining.

- Type 3 (a) Working lining consisting of standard carbon brick shapes.
  (b) Back-up lining consisting of standard brick shapes.
- Type 4 (a) Working lining consisting of carbon paste rammed onto back-up lining of cupola block or bricks.

TYPICAL PHYSICAL PROPERTIES OF AMORPHOUS CARBON SHAPES

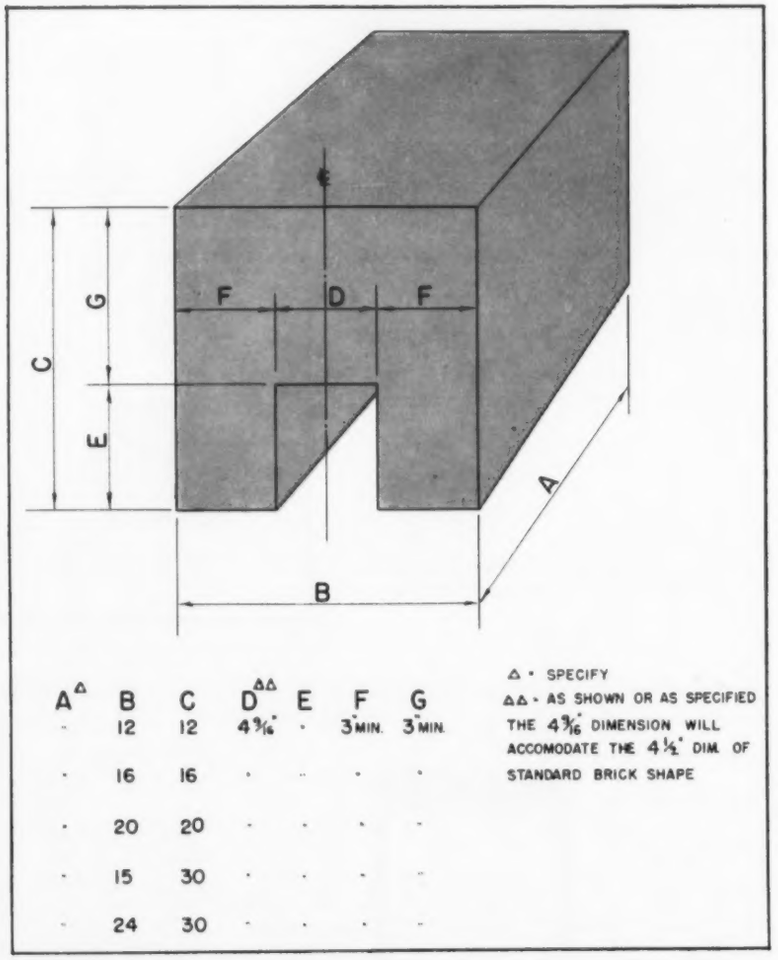
Apparent density	1.50
Porosity, %	23
Strength psi	
Tensile	600
Compression	4500
Flexural	1250
Elastic modulus x10^6,psi	1.25
Thermal conductivity Btu sq ft/sec/F	6
Mean coefficient of Thermal expansion %, 212 Fx 10^7/°F	13
Volume shrinkage	None

SELECTION OF SHAPES—Carbon bricks or carbon blocks are used to form the working lining of the well zone, and carbon bricks are used to form the back-up lining. When the lining is 9 in. thick or over, carbon blocks are used; and for thicknesses under 9 in., carbon bricks are indicated. In either case they are laid up with carbonaceous cements. Carbon ramming paste is used, as required, to maintain the original dimensions of the working lining.

Large block construction, illustrated in Fig. 1, has the advantage of fewer joints as compared to brick construction. Records of long life and low refractory cost per ton have been achieved with this type construction. These block linings are designed to have the minimum number of blocks per lining, consistent of course with the economical use of the base stock and local facilities for handling. Blocks weighing up to 1500 pounds have been fabricated; however, the weight per block is held to 100 lb or less when hoists or lifts are not available.

Carbon well-zone linings are also constructed by ramming carbon paste onto a back-up lining of blocks or bricks. The carbon paste forms the original working base. These linings have been very satisfactory and highly resistant to corrosive slags, for which purpose they were installed. The most common form of well zone construction employs either carbon brick or carbon block for the original working lining with the carbon paste used to maintain the lining as needed. This employs the maximum amount of high density material in the original lining.

DESIGN AND CONSTRUCTION—Figure 2 illustrates a lining utilizing block construction demonstrated in Fig. 1. Large carbon blocks are laid up against a back-up lining of carbon bricks. The carbon lining



A△	B	C	D△△	E	F	G
-	12	12	4 3/16"	-	3" MIN.	3" MIN.
-	16	16	-	-	-	-
-	20	20	-	-	-	-
-	15	30	-	-	-	-
-	24	30	-	-	-	-

△ - SPECIFY
△△ - AS SHOWN OR AS SPECIFIED THE 4 3/16" DIMENSION WILL ACCOMODATE THE 4 1/2" DIM. OF STANDARD BRICK SHAPE

Fig. 7 . . Grooved breast block can use replaceable tap hole inserts.

is laid on a course of ceramic brick 2 to 3 in. thick. Ceramic brick serve to insulate carbon from the mandrel plate. Space between the top of carbon blocks and bottom of shell is rammed with carbon paste so as to provide a positive closure against air leakage at this joint. Back-up lining provides protection for the cupola in the event of joint failure.

The outside diameter of carbon block working lining is radiused, as shown in Fig. 1 and 2. It should be laid up so that a minimum thickness joint exists between back-up lining and outside diameter of block lining. A center sweep, will prove useful in laying the back-up lining to a true circle.

Aligning of radial block joints is also simplified by the use of a sweep. If some of the carbon brick needs to be removed in order to hold a true circle, grinding wheels are more effective than saws on carbon brick.

Both the carbon block and brick should be laid up with carbon cement. Afterwards the inside face of the working lining should be wash-coated with a thin layer of ceramic refractory. This wash provides temporary protection during the burning-in period and before metal and slag have collected in the well zone.

Figure 3 illustrates a carbon well-zone lining designed to use either a carbon or a ceramic refractory back-up lining. If the shell is not externally cooled with water over the well-zone area, then the back-up lining should be ceramic brick for purposes of insulation.

In Fig. 3 the tuyeres are not water cooled. A course of ceramic brick is laid on top of the carbon lining, so as to be above the slag line. This is done to protect the top of carbon lining in the event that the tuyeres are burned back during the heat. If the tuyeres are normally intact at the end of each heat, then this intermediate lining is unnecessary and that space may be rammed with carbon paste, as in Fig. 2.

Tuyeres

Carbon construction may be adapted for use with either round water-cooled tuyeres or conventional box tuyeres. However, all records indicate longer life when the carbon lining is used in conjunction with water-cooled projecting tuyeres. By their use the air blast is maintained at a uniform distance away from the immediate vicinity of the lining.

Water-Cooled Shell

Exterior spray cooling of shell over the well zone is in effect in most installations of carbon well-zone linings and has a favorable effect upon the life potential of the lining.

When water cooling is not practical the carbon working lining may be used with a back-up lining of other refractories for insulating purposes.

Key Blocks

The key block is usually located opposite the breast block. In the case of a lining for projecting well zones, the key block has straight

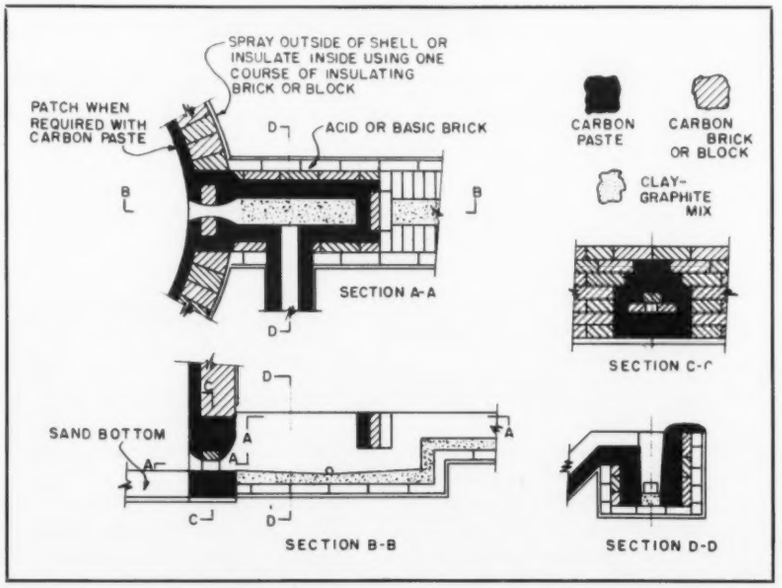


Fig. 8 . . Carbon withstands severe service in front slagging trough.

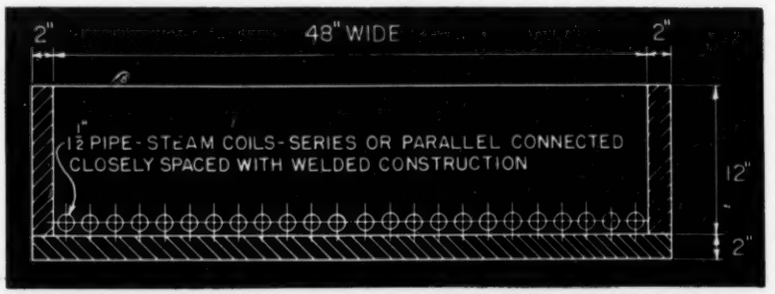


Fig. 9 . . Before ramming, the paste should be heated in a box or oven.

rather than radial sides since it must enter the lining on a horizontal plane. Whether its sides have radial cuts or square cuts, the last block to be installed usually requires trimming to proper thickness, as joints of minimum thickness are recommended. The design of the lining could allow for final closure by means of ramming and otherwise filling a vertical joint. This is not recommended, so the minimum joint approach is used.

Construction Features

Small capacity cupolas used in laboratories and for specialized low production service, should have a lining of high insulating material laid between the shell and carbon lining. This will prevent chilling small quantities of iron when in contact with relatively high thermal conductivity carbon. Figure 4 illustrates the well-zone blocks in a metallurgical blast cupola after being in service *for 55 days at 24 hours per day continuous tapping.*

In this particular construction the large wall blocks were laid directly against the shell and no back-up lining used. The greater than average thickness of lining was good assurance against penetration through joints. Also, the shell was such that good contact was made with the back contour of the blocks.

In this particular construction the shell is straight with no projecting well zone. Melting zone is lined, although the exterior of the shell is cooled by water sprays in both melting zone and well zone. The space between the two linings is shown ready for lining with carbon paste. Carbon spacing blocks are shown in place.

If the upper lining were not present, the melting zone could be operated bare. Carbon paste would be tapered back from the front edge of the top of carbon-wall block to a point on the shell at about the top of tuyeres.

When ramming carbon paste around tuyeres, prebaked carbon shapes may be used to fill some of the area and cut down on the volume to be rammed. Carbon brick are useful for this purpose.

Tap Hole and Breast Blocks

The necessity for reliable tap hole and breast construction has lead to the use of carbon where maintenance has been a problem. Carbon breast blocks were first used to withstand the action of basic slags in cupolas equipped with front slagging spouts and operating on long cycles.

Several types of carbon breast construction have evolved. Each has some advantage causing it to be preferred for particular operating conditions.

- Fig. 5 . . Block slotted for replaceable tap hole insert.
- Fig. 6 . . Block and brick construction.
- Fig. 7 . . "Floating" block with groove to tap hole; dimensions are oversize, replaceable inserts.

The breast block illustrated in Fig. 5 is similar to the one shown in Fig. 1 and 2. An integral part of the block lining, it is assembled directly against the shell. A brick back-up lining is dispensed with in the case of this block. A back-up lining is used between the shell and the remaining carbon blocks.

A rectangular section of this block projects into the front slagging trough eliminating a joint at point where trough connects to shell. Size of the projecting section is determined by trough dimensions and size of breast hole in the shell. Height and width are 1/4-in. per side less than rectangular opening in the shell. The lengthwise projection into trough is nominally 6 inches, if the taper of trough allows.

The slot is made oversize to accommodate replaceable tap hole construction. Because tap hole is renewable, the block itself will last from six months to a year and one-half, and possibly longer. The re-

Continued on page 62

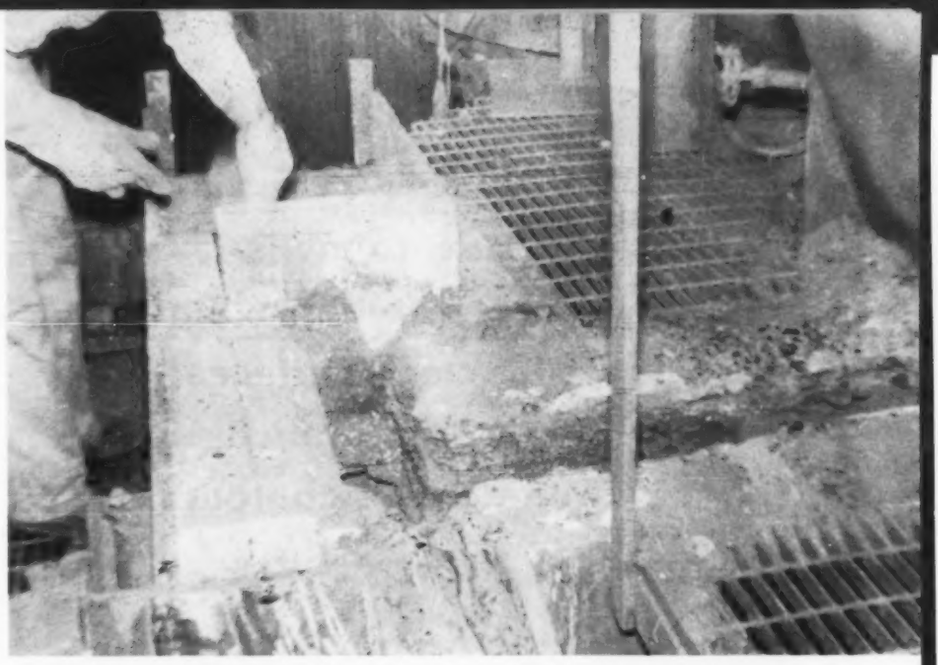


Fig. 10 . . Carbon plate used as dam in trough, resists acid or basic slag.

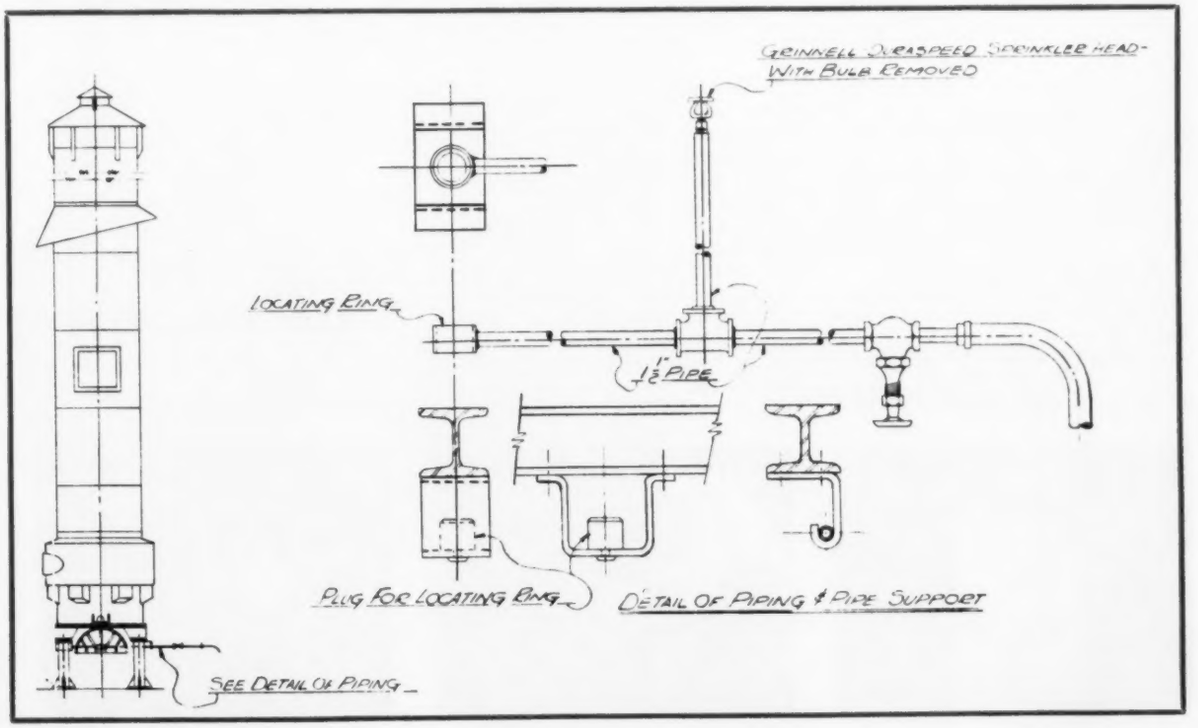


Fig. 11 . . After dropping bottom, carbon lining can be cooled rapidly by using this rig to spray water on lining.

Carbon Refractories

Continued from page 61

placeable tap hole construction uses formed inserts furnished by suppliers in carbon or other refractory materials. The usual construction has carbon at the top of tap hole and basic or acid refractories on the bottom in contact with the iron.

Tap Hole Maintenance

Ramming carbon paste around a steel pipe or form serves as an alternate method of replacing tap hole. In either case, the permanent block can be repaired with carbon paste to maintain the rectangular slot to its original form in the event wear extends beyond the insert material into the baseblock itself.

This particular type of construction proved satisfactory in a number of installations. It has the advantage of eliminating all joints in breast opening except joint between insert and block.

Figure 6 illustrates the use of a large carbon block to withstand slag attack at the top of tap hole. In this type of built-up construction the breast opening may be closed with blocks, brick, or ramming material—usually with a combination of all three. Brick forming the sides of the tap hole are carbon. Bottom of tap hole is a basic rammed material.

The breast block illustrated in Fig. 7 is grooved. Depending on allowable space, this groove may be oversize to accommodate replaceable tap hole inserts. If a smaller block is used, the groove may have the exact dimensions of tap hole.

In addition to the three constructions illustrated, satisfactory service has been obtained from completely rammed breasts with the tap hole formed by a steel pipe which is left in place. When a complete carbon block lining is to be installed, the construction shown in Fig. 5 is recommended. The other types of construction shown in Fig. 6 and 7 lend themselves readily to all other well-lining constructions.

Front Slagging Trough

Figure 8 illustrates the carbon-lined front slagging trough. Carbon lining is carried up to and includes

the slag dam and slag spout itself. The carbon lining is not normally extended past the slag dam. Carbon paste rammed around forms, carbon bricks, and carbon blocks is used in front slag trough lining. Carbon is highly resistant to either acid or basic slag attack. Carbon used at this point guarantees uninterrupted service for cupolas operating on extended production heats.

The most economical form of carbon for forming front slagging troughs is carbon paste rammed around a wooden form.

Carbon paste used for this purpose must be heated to a temperature of approximately 200 F at which point it becomes plastic and readily ramable. After ramming it hardens. Upon removal of the form it should be supported in place and baked to approximately 1100 F. At this temperature it takes a final hardening set.

Figure 9 illustrates a box and heating coil suitable for warming the paste for ramming purposes. If steam is not available, paste is readily heated in a core oven.

Next to the trough shell a course of ceramic refractory brick are laid for insulating purposes. The carbon paste may be rammed directly onto these bricks. Or, if space allows, an intervening course of carbon brick will afford extra protection against slag attack.

The sides of the front slagging trough may be constructed of carbon brick or block, if preferred. The choice between the baked forms and the ramable carbon paste for lining front slagging trough is largely a matter of individual preference, either material being completely resistant to slag attack.

Figure 10 illustrates a carbon slag dam consisting of a carbon plate. Plates may be secured in any size and are equally effective in the presence of acid or basic slag.

Cupola Linings—Maintenance

When the cupola bottom doors are dropped, the incandescent carbon lining is exposed to oxidizing conditions to a greater extent than when the cupola is in operation. However, it should not be assumed that rapid combustion occurs. Most operators make no effort to quench or wet down the carbon lining.

Continued on page 64

Carbon Refractories

Continued from page 63

Sufficient data are not available to evaluate the effect of quenching versus not quenching. However some operators find it desirable to quench the lining immediately after the drop. The apparatus shown in Fig. 11 is used for this purpose. A sprinkler head is positioned to project water sideways and not upward. The positioning ring on end of pipe holds nozzle in an upright position, and the length of the pipe allows the operator to stand at a safe distance from the drop.

Cooling after the drop is recommended if operating conditions allow. Theoretically they will cut costs, but their use has not been evaluated in terms of dollars and cents.

Lining Repair

Carbon paste is used to repair the carbon block or brick lining after it has worn sufficiently to require patching. Surfaces to be patched should be cleaned free of slag and primed with a light coating of water-free tar before applying paste.

After the paste has been rammed into position, the heat of coke bed will suffice to set and harden the paste. When using paste for repair purposes, it should be hot enough to ram easily. If the paste hardens and becomes difficult to ram, subject it to further heating. Alternate heating and cooling cycles do not harm or affect plasticity of the paste unless carried on over an extensive period of time.

■ This article is based on a paper entitled *"Carbon Refractories"* which was presented at a Gray Iron Session of the 1957 AFS Castings Congress.

Bulletin Covers Use of Epoxy Resins in Tooling

Opportunities, uses, advantages, and disadvantages of plastic for tools, dies, jigs, and fixtures are summarized in a 4-page publication issued by the Small Business Administration. Other subjects covered are tools and materials required for manufacturing epoxy resin patterns and core boxes, and hints on selecting and using resins.

"Use of Plastics for Tools, Dies, Jigs, and Fixtures," may be obtained free, **Circle No. 3, Reader Service Card, page 7-8.**

British Steel Association Opens Laboratories

■ Laboratories, experimental foundry, and offices were officially opened in June at Sheffield, England, by the British Steel Castings Research Association. Approximately $260,000 was spent for the buildings and equipment. A staff of 48 persons is maintained.

The experimental foundry occupies an area 40 x 90 ft. Sand mixing equipment includes a 500-lb capacity batch mix-muller for molding sand and an 80-lb capacity core-sand and shell molding sand mixer.

Molding and coremaking are provided for by a simultaneous jolt-squeeze molding machine and a core blower as well as facilities for hand molding and coremaking.

Two melting furnaces, one of 500-lb capacity and one of 30-lb capacity are used. The larger furnace is a graphite rod resistor furnace suitable for pilot-plant research. The smaller furnace is a conventional high frequency electric furnace.

Investment Casters Will Hold Meeting in November

■ The Investment Casting Institute will hold its annual fall meeting at the Sheraton Hotel, Chicago, November 19-21.

Committee meetings will be held Tuesday, with the technical sessions scheduled for Wednesday, and business sessions on Thursday.

Included in the technical program will be a discussion of the advantages and disadvantages of induction melting and carbon arc melting of high alloy steels by L. J. DiNuzzo of the General Electric Co. foundry department. N. J. Grant, Massachusetts Institute of Technology, will review his recent trip and tour of the Soviet steel mills in Russia and Siberia.

Presentations to be made by subcommittees of the I.C.I. process materials committee will include a demonstration of standardized test procedures for determining the physical properties of proprietary investments, a demonstration of test procedures on pattern materials, and a paper on low melting plastic pattern materials.

W. I. Matthes, Arwood Precision Casting Co., Brooklyn, N.Y., is chairman of the technical session program committee.

The business session program for the annual meeting has been planned under the chairmanship of P. W. Schipper, Investment Casting Div., Howard Foundry Co., Chicago.

Shell Molding Cuts Cost, Ups Quality of Ice Blades

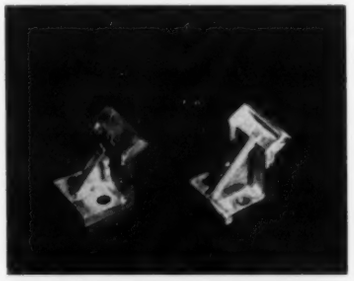
Reduced costs combined with better corrosion resisting qualities in ice removing blades are being achieved through shell molding.

These blades formerly fabricated from bar steel for Carrier Corp.'s automatic flake ice-making machines, are now cast of manganese bronze by Bennett-Ireland, Inc., Norwich, N.Y. at 50 per cent saving. In addition, a four-piece ice scraping blade is being integrally cast by shell molding.

Four piece blade becomes simpler, cheaper casting.

Shell cores for the removal blades are made on a standard dump shell core machine using a split aluminum core box with ejector pins.

The cores are placed in the mold and the entire assembly cemented with a phenolic adhesive and the castings poured horizontally in high strength manganese bronze. After cooling and shakeout the gates are sawed.



Corrosion resistance added by using manganese bronze.

Finishing Operations

In finishing tips of the cutter

blade are form milled, the flanks are dressed, the gate holes ground smooth and the casting given a shot blast.

Scraping blades are made with the same techniques. Both blades are chrome plated to give long wearing tooth surfaces. Previously they had been built up by plating with copper, nickel and chrome.

Both blades are part of an assembly which flakes ice from the cylinder walls. Ice is produced in a vertical cylinder wrapped in refrigerant coils covered with cork insulation. A curtain of water flowing down the inside builds up a thin ice film.

An arc in the slowly turning water distributing plate blanks off the water flow, thereby permitting the ice ahead of the ice removal blade to sub-cool to 14 F. The ice cracks as it slowly sub-cools and is immediately gathered by the scrapper. The flakes drop from the bottom of the cylinder into an insulated storage bin.

H. F. Greek, Hill & Griffith President, Dies in August

Harry F. Greek, 48, president, The Hill & Griffith Co., Cincinnati, died August 28.

Mr. Greek attended the University of Cincinnati and joined Hill & Griffith Co. in 1934 as foreman, becoming president in 1945. He was a director of the Cincinnati District Chapter of AFS 1950-1953 and vice-chairman and chairman of that Chapter 1953-1955.

H. F. Greek

INDISPENSABLE MAN

I wasn't cut out for a boss
Or to figure out method or cost
You've gotta be wise to instruct other guys
And to shoulder the rap for a loss.

I've neither the urge nor the flair
To hold down the President's chair
Does lack of ability disturb my tranquility?
The fact is, I don't even care.

I'm contented, sedate as can be
The reason is easy to see:
There's no other job more essential than mine
No one more important than me.

Some direct and some sell, as they should
And though sometimes I wish that I could
I reflect, "This is true—somebody must hew
The water, and carry the wood."

For men of all breeds and all brands
Must handle the metals and sands
And to back up the play, every time, every day,
Is the fellow who works with his hands.

So no matter what labor you do
There's really no cause to be blue.
There's no other job more essential than yours,
No one more important than you.

■ From *The Foundry Bard*, a column of foundry poems appearing in *The ESCO Ladle* of the Electric Steel Foundry Co., Portland, Ore., Bill Walkins, former sand mill operator, is both the editor of the *Ladle* and the one, and original Foundry Bard.

Install Automatic Finishing Facilities for Die Castings

High-speed automatic finishing for die castings has recently been installed by Precision Castings Co. Div., Harsco Corp., Syracuse, N.Y. These facilities, costing more than $500,000, include elaborate automatic equipment for cleaning copper-nickel and chrome or brass plating, phosphate coating, electrostatic spray painting, baking and polishing.

The equipment can handle die castings from 1 sq in. up to 14 x 36 in. areas. Only one man is required to operate and transfer racks from cleaning to the plating line. Another man removes racks to the bright brass line when required.

MORE FACTS on all products, literature, and services shown in the advertisements and listed in Products & Processes and in For the Asking can be obtained by using the handy Reader Service cards, pages 7-8.

AFS news

Installation of Piedmont Chapter Increases Society's Total to 47

Newest member has operated as part of Chesapeake group

■ Installation of the Piedmont Chapter, September 13, brought to 47 the number of American Foundrymen's Society chapters—the largest in the Society's history.

The chapter's petition for admittance was formally approved in August by the AFS Board of Directors. Installation was made at the Hotel Chamberlin, Old Point Comfort, Va. Wm. W. Maloney, AFS General Manager, welcomed the chapter on behalf of the Society and presented them with the traditional cast-iron rattle symbolic of their being the youngest AFS chapter.

The territory of the new chapter includes South Carolina, North Carolina, 18 counties in West Virginia, and all Virginia, except the five northern counties. Previously the chapter had operated as the Southern Section of the Chesapeake Chapter.

Officers and Directors of the new chapter are:

Chairman—W. W. Levi, Lynchburg Foundry Co., Radford, Va.

Vice-Chairman—D. E. Matthieu, Richmond Foundry & Mfg. Co., Richmond,

Secretary—J. L. Williams, Kerschner Marshall & Co., Portsmouth, Va.

Treasurer—J. C. Keith, White Foundry Co., Roanoke, Va.

Directors (Terms expire 1958)

W. W. Austin, North Carolina State College, Raleigh, N. C.

R. J. Hanner, Queen City Foundry, Inc., Charlotte, N. C.

L. A. Howell, Newport News Shipbuilding & Dry Dock, Newport News, Va.

(Terms expire 1959)

T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va.

D. W. Davis, Jr., Wayne Agriculture Works, Inc., Goldsboro, N. C.

A. R. Miles, Sykes Foundry & Machine Co., Burlington, N. C.

(Terms expire 1960)

J. A. Hogan, Walker Machine & Foundry Corp., Roanoke, Va.

G. Knight, J. C. Steele & Sons, Statesville, N. C.

A. Renard, Glamorgan Pipe & Foundry Co., Lynchburg, Va.

Twin City Chapter Conducts Annual Golf Meet at St. Paul

Twin City Chapter members held their annual golf party in August at the Midland Hills Country Club, St. Paul, Minn. M. G. Flatten, Midwest Pattern Co., was chairman of the golf committee. The various events and winners were: low gross golf for guests, J. Bloom, Minneapolis Honeywell Regulator Co.; low gross golf for members, J. J. Petrie, National Foundry Co.; low net golf, R. L. Johnston, Foundry Supply Co. In events for non-golfers, W. E. Wahman, Northern Malleable Iron Co., won the low gross putting contest, and W. Carney, American Hoist & Derrick Co., was the winner in the casting weight guessing contest.

Southern California Keeps Active with Summer Program

A change of pace from technical programs to social activities during the summer months kept the **Southern California Chapter** functioning while many chapters temporarily discontinued meetings.

In June, a past president's night was held and in August, the chapter conducted its annual picnic.

More than 125 members, including 11 past presidents attended the June meeting. New Chapter officers were also installed. Past presidents in attendance were A. G. Zima, L. O. Hoffstetter, B. G. Emmett, H. Chappie, R. Gregg, E. Anderson, J. Eppley, H. Pagenkopp, C. Gregg, H. Howell, and W. C. Baud.

Officers installed for the coming year were: *president*, F. C. Warga, AiResearch Mfg. Co.; *vice-president*, O. H. Rosentreter, Otto Rosentreter & Co.; *secretary*, E. G. Gaskell, Ace Foundry Ltd.; *treasurer*, F. E. Dye, Burndy Engineering Corp.

The annual picnic held at Long Beach drew a crowd of 400 members and guests. Golfing competition was held in addition to horseshoes and soft ball.

A western style dinner was served outdoors and a variety show was presented.

Relaxing at Chapter picnic.

Increase Cash Awards for Apprentice Contest

Further stimulation has been added to the American Foundrymen's Society Robert E. Kennedy Memorial Apprentice Contest through the increase in cash prizes and additional travel for winners.

Cash prizes for 2d place winners in each contest division have been increased from $50 to $75; 3d place cash prizes have been raised from $25 to $50. Cash awards for first

Wisconsin Chapter members held their annual golfing outing this summer. Shown in photo are chapter officers and the golfing committee. Left to right are: H. Seeboth, J. Westover, Chapter Secretary L. Andres, Chapter President N. Amrhein, T. Meagher, C. Gehrman, M. Noller, G. Tisdale, E. Sadek, D. Gehrlinger, and M. Peterman. MILWAUKEE CHAPLET PHOTO

Northeastern Ohio Chapter officers, directors, and former officers discussed plans for the coming year at August meeting. Attending were, front row, left to right, are: H. E. Heyl, secretary; H. R. Strater, treasurer; E. C. Jeter, chairman; A. D. Barczak, former chairman; F. J. Pfarr, AFS National Director; and C. J. Jelinek. Second row: W. O. Larson, Jr.; W. B. Bishop; W. E. Mahoney; J. D. Robbins; L. R. Lansky; J. H. Sibbson, Jr, E. J. Romans, 1st vice-chairman; J. J. Schwalm; and J. C. Miske. The picture was taken by H. Wheeler, a director.

AFS news

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place winners remain at $100.

Under modification of contest rules, both 1st and 2d place winners in each of the five contest divisions will be invited to the 1958 Castings Congress & Foundry Show in Cleveland to receive their awards. The Society will assume round-trip travel expenses to and from Cleveland.

The 1958 Apprentice Contest officially opens October 1, 1957. All entries to be considered for national judging must be received by R. W. Schroeder at the University of Illinois, Navy Pier, Chicago, **not later than 5:00 pm Monday, April 7, 1958.**

Additional information on the contest is contained in a full-page announcement in this issue of MODERN CASTINGS.

Annual Northwest Regional to be Held in British Columbia

■ A tentative program has been released for the 8th Annual Northwest Regional Conference to be held 18-19 at the Hotel Vancouver, Vancouver, British Columbia.

The conference will be sponsored by the Oregon, Washington, British Columbia, and Oregon State Student chapters of the American Foundrymen's Society.

Friday's activities will be confined to registration and a banquet. Dr. G. M. Shrum, University of British Columbia, will talk on *"Research–A Yardstick to Progress."*

On Saturday morning, a film, *"Smoke Control and the Electric Furnace"* will be shown and Audrey S. Tuttle, International Nickel Co., will talk on *"Nickel in Non-Ferrous Alloy."* Prof. F. A. Forward, Department of Mining and Metallurgy, University of British Columbia, will be the luncheon speaker.

In the afternoon Dean H. Goard, Vancouver Vocational Institute, will discuss *"Present and Future Training for the Foundry,"* and F. W. Kellam, Electro Metallurgical Co. Div., Union Carbide of Canada, Ltd., will present *"Cupola Operation and Cast Iron Metallurgy."*

A dance will be held Saturday evening at the Stanley Park Pavilion. A ladies' program will also be held Saturday.

SH & AP Program for Industry Aided by AFS Operating Funds

Financing from AFS operating revenues will enable the Safety, Hygiene and Air Pollution Program to continue its activities without solicitation of funds from the foundry industry.

The program was reactivated in 1950 at the request of the National Castings Council and financed originally through industry contributions. During the six-year period, July, 1951 through June, 1957, a total of $38,143 has been contributed from AFS operating revenues in order to continue the program on behalf of the foundry industry.

A statement of income and expense of the SH & AP activities July, 1951 to June 30, 1957 has been sent to all contributors to the program.

INCOME		
Contributions to SH&AP Fund	$75,778.53	
Sales of Publications (listed below)	17,660.00	
TOTAL INCOME, 6 YEARS		$ 93,438.53
EXPENSE		
Staff Salaries (direct)	$64,644.87	
Committees Travel & Expense	6,092.21	
Staff Travel & Expense	10,071.49	
Promotional Expense	1,025.96	$ 81,834.53
Overhead Distributed:		
Salaries (pro.)	$12,356.25	
Burdens (pro.)	19,532.26	$ 31,888.51
*Publications Produced (direct costs):		
Foundry Safety Manual (1957)	$ 977.09	
Air-Pollution Manual (1956)	3,666.44	
Control of In-Plant Environ. (1956)	7,314.86	
Control of Melting Furn. Emissions (1955)	2,079.19	
Symposium, Air Pollution	356.57	
Symposium, Dust Control	487.95	
Symposium, General SH&AP	439.54	
Health Protection in Foundries	2,369.95	
Misc. Literature Reprints	167.70	17,859.29
TOTAL EXPENSE, 6 YEARS		$131,582.33
EXCESS EXPENSE, 6 YEARS (Financed from AFS Operating Revenues)		$ 38,143.80

(* Inventory of Publications in Stock 6/30/57, at Cost—$6,474.68.)

Niagara Frontier Regional Has Full Technical Program

■ An extensive analysis of foundry problems will be made by speakers from the east, northeast, south, and middle-western sections of the United States as well as Canada at the Niagara Frontier Regional Foundry Conference to be held October 24-25 at Buffalo, N.Y.

Simultaneous technical sessions covering malleable, non-ferrous, gray iron, steel, stainless steel, and pattern-making will be held Thursday afternoon and Friday.

The regional is sponsored by the Western New York, Northwestern Pennsylvania, Rochester, Central New York, Eastern New York, and Ontario Chapters of the American Foundrymen's Society.

Western New York is the host chapter. Leonard Greenfield, Samuel Greenfield Co., Buffalo, N.Y., is the general chairman.

The conference will be opened at 10:00 am by Dr. C. C. Furnas, Chancellor, University of Buffalo, presenting the welcoming address. Reports on AFS activities will be presented by AFS General Manager Wm. W. Maloney and O. J. Myers, AFS Director.

Morning activities will be concluded by W. G. Gude, managing editor, *Foundry*, speaking on *"Present Status and Prospects for the Foundry Industry."* He will be introduced by W. D. Dunn, AFS Director.

Featured speaker at the Thursday luncheon will be W. H. Bleakley, Abco, Inc., Erie, Pa. His subject will be "Safety."

The remainder of the program:

THURSDAY, OCT. 24

2:30 pm—*Malleable Session.*
Chairman J. C. Goetz, Acme Steel & Malleable Iron Works, Buffalo, N. Y.
"Fundamentals of Sand Control," E. E. Woodliff, Foundry Sand Service & Engineering Co., Detroit.

2:30 pm—*Non-Ferrous Session.*
Chairman G. M. Johnston, Neptune Meters, Ltd., Toronto, Canada.
"Metal Mold Reactions in Bronze Alloys," R. B. Fisher, Ingersoll-Rand

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Co., Phillipsburg, N. J.

2:30 pm—*Gray Iron Session.*
Chairman O. Pietsch, Pohlman Foundry Co., Buffalo, N. Y.
"The Development of Pacumatic Sand Reclamation Equipment," C. E. Wenninger, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago.

2:30 pm—*Steel Session.*
Chairman M. Ganzauge, General Railway Signal Co., Rochester, N. Y.
"Steel Castings to Compete with Other Materials," C. B. Jenni, General Steel Castings Corp., Eddystone, Pa.

2:30 pm—*Stainless Steel Session.*
Co-chairmen: G. Bott, Welland Electric Steel Foundry Ltd., Welland, Canada, and R. W. Mason, Curtiss-Wright Corp., Buffalo, N. Y.
"Production Problems Encountered in Making Stainless Steel Castings," E. A. Schoeffer, Alloy Casting Institute, Mineola, N. Y.

2:30 pm—*Patternmaking Session.*
Chairman R. Pugh, Chevrolet-Tonawanda Foundry Div., GMC, Buffalo, N. Y.
"Pattern Engineering," R. Olson, Southern Precision Pattern Works, Birmingham, Ala.

6:30 pm—Dinner and party, Town Casino

FRIDAY, OCT. 25

10:00 am—*Non-Ferrous Session.*
Chairman L. Iannatonio, Oberdorfer Foundries, Syracuse, N. Y.
Speaker and subject to be announced.

10:00 am—*Gray Iron Session.*
Co-chairmen: A. E. Edwards, Chevrolet-Tonawanda Foundry Div., GMC, Buffalo, N. Y., and P. J. Provias, International Nickel Co. of Canada, Ltd., Toronto, Canada.
"General Cupola Practice," W. L. Adams, International Minerals & Chemical Corp., Chicago.

10:00 am—*Steel Session.*
Chairman J. H. Sander, Tonawanda Electric Steel Castings Corp., North Tonawanda, N. Y.
"Russian Foundry Industry," A. J. Kiesler, General Electric Corp., Schenectady, N. Y.

10:00 am—*Malleable Session.*
Chairman E. Burke, Acme Steel & Malleable Corp., Buffalo, N. Y.
"Stress Analysis Use on Improving Casting Design," R. L. Gilmore, Superior Steel & Malleable Co., St. Joseph, Mich.

10:00 am—*Patternmaking Session.*
Chairman I. Stohle, Symington-Gould Corp., Depew, N. Y.
"Latest Developments in the Pattern Industry," W. Siebert, Cleveland Standard Pattern Works, Cleveland.

12:00—*Luncheon.*
Speaker, New York State Senator Walter B. Mahoney.

2:30 pm—*Non-Ferrous Session.*

Chairman E. J. Baker, Federated Metals Div., American Smelting & Refining Co., Rochester, N. Y.
"Gas and Its Control in Aluminum Casting," D. L. LaVelle, Kaiser Aluminum & Chemical Sales Corp., Chicago.

2:30 pm—*Stainless Steel Session.*
Co-chairmen: L. Wright, Symington-Gould Corp., Depew, N. Y., and L. W. Krum(Strong Steel Foundry Co., Buffalo, N. Y.
"Melting Stainless Steel," L. Coshdollar, Pittsburgh Metallurgical Co., Niagara Falls, N. Y.

2:30 pm—*Gray Iron Session.*
Co-chairmen: F. Goerke, Standard Foundry, Buffalo, N. Y., and L. D. Wright, National-U. S. Radiator Co., Geneva, N. Y.
"Which Core Process," A. Dorfmeuller, Archer - Daniels - Midland Co., Cleveland.

2:30 pm—*Steel Session.*
Chairman W. Stewand, Dominion Steel Foundry, Hamilton, Ontario.
"Core and Molding Sand Additions," J. A. Gitzen, Delta Oil Products Co., Milwaukee.

Purdue Site of 10th Annual Industry-Education Meeting

■ A decade of cooperation between the castings industry and Purdue University will be observed with the 10th Annual Metals Casting Conference to be conducted at Lafayette, Ind., Oct. 31-Nov. 1.

The program will be conducted in the Purdue Memorial Union Building and sponsored by the Michiana and Central Indiana Chapters of the American Foundrymen's Society and Purdue's School of Chemical Metallurgical Engineering and the Division of Adult Education.

C. O. Schopp, Link-Belt Co., Indianapolis, is conference chairman. W. E. Patterson, Elkhart Foundry & Machine Co., Elkhart, Ind., is the program chairman.

THURSDAY, OCT. 31

9:00 am—Registration.

10:00 am—Conference opening by Chairman Schopp.
Welcome: Dr. Paul Chenea, Purdue University.
Response: L. H. Durdin, AFS Vice-President.

11:15 am—Chairman J. B. Essex, Golden Foundry, Columbus, Ind.
"What Can We Expect From Our Vendors," E. Miller, Cummins Engine Co., Columbus, Ind.

1:30 pm—Chairman J. C. Maggart, Sib-

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ley Machine & Foundry Co., South Bend, Ind.

"Practical Scrap Reduction," H. Felton, Peoria Malleable Castings Co., Peoria, Ill.

3:00 pm—Chairman L. E. Emery, Marion Malleable Iron Works, Marion, Ind. Modern green sand molding panel: *"Diaphragm Molding,"* W. C. Cheek, Central Foundry Div., GMC, Danville, Ill.

"Stack Molding," speaker to be announced.

"Jolt Squeeze," C. H. Lambert, Eberhard Mfg. Co. Div., Eastern Malleable Iron Co., Cleveland.

"Sandslinger," W. E. Patterson, Elkhart Foundry & Machine Co., Elkhart, Ind.

6:00 pm—Banquet.
Toastmaster: R. W. Lindley, Purdue University.
"Human Engineering," H. Heinrichs, Institute of Human Science, Chicago.

FRIDAY, NOV. 1

10:00 am—Chairman C. L. Bowman, Dalton Foundries, Inc., Warsaw, Ind. *"Hot-Blast and Moisture Control,"* C. F. Joseph, Central Foundry Div., GMC, Saginaw, Mich.

11:15 am—Chairman H. H. Montgomery, Purdue University.
"Hot Tearing," R. W. Heine, University of Wisconsin, Madison, Wis.

1:30 pm—Chairman H. B. Voorhees, manufacturers agent, Mishawaka, Ind.
"Ductile Iron," speaker to be announced.

3:00 pm—Conference summary.
C. T. Marek, Purdue University, and Conference Chairman Schopp.

Committee Named to Nominate AFS Officers and Directors

■ A nominating committee to select officers and directors for election at the 1958 Annual Business Meeting of the American Foundrymen's Society was named August 8 at a meeting of the Society's Board of Directors.

Five committee members were selected from lists submitted by chapters eligible this year to suggest members. These five, together with the two immediate past presidents, will meet December 9 in Chicago to nominate a president, vice-president, and six directors, endeavoring as prescribed by AFS by-laws, "To provide equitable and constant regional representation, and . . . representation for the several branches of the castings industry."

Members of the nominating committee are:

Past President **F. W. Shipley,** Caterpillar Tractor Co., Peoria, Ill.

Past President **B. L. Simpson,** National Engineering Co., Chicago.

E. W. Deutschlander, Worthington Corp., Buffalo, N. Y.; representing Region I; Chapter Group C—Western New York Chapter; and Gray Iron.

E. H. King, Hill & Griffith Co., Cincinnati; representing Region II; Chapter Group G—Cincinnati Chapter; and Supplies.

J. W. Costello, American Hoist & Derrick Co., St. Paul, Minn.; representing Region III; Chapter Group L—Twin City Chapter; and Patternmaking, Gray Iron, Steel and Non-Ferrous.

A. L. Hunt, National Bearing Div., American Brake Shoe Co., St. Louis; representing Region IV; Chapter Group N—St. Louis District Chapter; and Brass and Bronze.

S. D. Russell, Phoenix Iron Works, Oakland, Calif.; representing Region V; Chapter Group Q—Northern California Chapter; and Gray Iron.

committees in action

■ The relationship between AFS and the AFS Training & Research Institute was reviewed at the July meeting of the Research Committee of the Training & Research Institute held in Chicago. Also discussed were the reasons for transferring projects from AFS to the Institute.

Responsibilities and scope of the Research Committee were outlined as follows:

- Approval of projects as submitted by various AFS Research Committees.
- Recommendation to the Institute Trustees for financial allotments to the various AFS Research Committees.
- Re-allocation of funds if amount available differs from that requested.
- Recommendations to the Trustees as to the use of funds which may be available from sources other than AFS.
- Selection of the project, request for funds, and the follow-up is the responsibility of Divisional Research Committees as well as Divisional Executive Committees, and not the Institute Research Committee.
- Authorize capital expenditures for research equipment and its utilization.

■ W. E. Remmers, vice-president,

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Union Carbide Corp., will present the Annual Lecture at the 1958 Castings Congress to be held in Cleveland. His selection was announced at the July meeting of the AFS Annual Lecture Committee meeting in Chicago. The lecture will follow the Annual Business Meeting of the Society. Mr. Remmers' subject has not been announced.

Possible candidates for the Annual Lecture in 1959 and 1960 were also suggested.

The committee discussed the advisability of considering European technologists as lecturers. This idea will be presented to the Board of Directors by AFS Technical Director S. C. Massari.

■ In line with the Society's policy of providing the latest technical information on all phases of the castings industry, steps have been initiated to form a new Die Casting & Permanent Mold Division.

This division will give recognition to the growing importance of these two methods of producing castings. The division will promote the accumulation and dissemination of information including both the light metals and zinc-base alloys as well as heavier metals such as copper and iron and its alloys.

The organization of this division is in the hands of the present chairman of the Die Casting Committee; that committee and the Permanent Mold Committee will form the nucleus of the new division.

■ Steps toward completing the FOUNDRY NOISE CONTROL MANUAL were taken at the May meeting of the Noise Control Committee meeting held in Chicago. Sub-committees were given the task of preparing a glossary and revising the section on Foundry Noise Exposures. Illustrations and methods are being sought for the section devoted to controlling and analyzing noise before and after the installation of corrective measures.

Dr. Eugene L. Walsh, a committee member, has agreed to prepare and present a paper on some phase of the noise problem at the 1958 Castings Congress.

■ Committee reports outlining past and future activities were presented at the meeting of the Executive Committee of the Sand Division held in

June in Chicago. A summary of these activities follows:

Program & Papers Shop Course Committee — Plans are being made for a symposium and papers to be presented at the 1958 Castings Congress.

Core Test Committee — Has been investigating variables in CO_2 test gassing, checking and comparing data with supplies of silicate binders and CO_2 gas. Work is underway on the tensile strength test; correlation has been found between bakeability test results and tensile baking curves.

Flowability Committee — Investigating the uniformity of sand surface compaction phase of flowability.

Grading, Fineness & Distribution Committee— Continues its work on segregation and sampling methods. Grain distribution will be studied.

Mold Surface Committee — Three sub-committees are active on 1) mold surface, 2) surface finish measurement methods, 3) freezing rates.

Physical Properties of Iron Foundry Molding Materials at Elevated Temperatures Committee — Using statistically designed experimental methods.

Sand Handbook Revision Committee — Continues work on book which will include methods of casting titanium, rare earths, and uranium.

Shell Molding Materials Testing Committee — Has proposed three new tentative tests. These are: loss on ignition, tensile, blown tensile. A test for hot cracking of shell molds is planned.

Basic Concepts Committee — Plans a symposium reviewing work for presentation at the 1958 Castings Congress.

■ Prospective papers, American and foreign, available for presentation at the 1958 Castings Congress, were discussed by the Brass and Bronze Division meeting held at Phillipsburg, N.J. Representatives of the Program and Papers Committee and the Round Table Conference and Shop Course Sub-Committee attended.

Technical sessions have been tentatively scheduled for the division on the mornings of Thursday, May 22, and Friday, May 23. A shop course will be held Thursday morning dealing with casting design as applied to foundrymen and a noon round table discussion will be held Friday replacing the previously scheduled breakfast. Three speakers will talk on "New Developments in Copper-Base Alloy Casting Methods" at the round table meeting.

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If sufficient acceptable papers are obtained, an evening session may be scheduled.

Other action included:

- Suggestions that Monday and Tuesday technical sessions be requested for the 1959 and 1960 conventions.
- Recommendation that colleges be contacted as sources for 1959 Castings Congress convention papers.

■ To provide a better dispersion of attendance at the 1958 Foundry Show in Cleveland, areas of operating interest will be established throughout the Cleveland Public Auditorium. This policy was established at the June meeting of the 1958 Committee of Exhibitors held in Chicago.

Two changes were made in the exhibition rules and regulations for 1958.

- Exhibits will open 8:30 am Monday, May 19; exhibits close Wednesday, May 21, 9-11 am, re-opening at 11 am.
- Friday, May 23, has been designated as "Northeastern Ohio Day" with exhibits open to 5 pm.

Ground rules were made for establishment of centers of interest for the largest exhibit space users. It was agreed that a meeting of exhibitors occupying 1000 sq ft or more in either 1954 or 1956 would be called in September. All assignments of space will be tentative until October 1, 1957, the official date for space assignment. All large space users who receive early assignment of 1958 exhibit space by the Space Assignment Committee must hold company or sustaining membership in AFS.

Other action taken by the committee included:

- Confiing exhibitors at the 1959 Engineered Castings Show, scheduled for April 13-17 in Chicago, to producers of castings and patterns.
- Recommending that AFS endeavor to develop a workable plan to permit trade association exhibits at future shows.
- Approving of extensive ground rules governing the Largest Space Users.
- Announcing dates and locations for future conventions and exhibits.

These are:

1958—May 19-23	Cleveland Castings Congress and Foundry Show.
1959—April 13-17	Chicago Castings Congress and Engineered Castings Show.
1960—May 9-13	Philadelphia Castings Congress and Foundry Show.
1961—May 14-19	Boston Castings Congress and Engineered Castings Show.
1962—May (tent.)	Detroit International Foundry Congress; Castings Congress and Foundry Show.

■ Status of the gating research program sponsored jointly by AFS and the Ordnance Corps at Battelle Memorial Institute, was discussed at the June meeting of the Light Metals Research Committee held in Cleveland.

The present program covers three phases.

- The development of a suitable technique.
- The actual research.
- Analysis of the data and its presentation in a readily usable form.

Work completed to date on the project was reviewed, particularly the unsuccessful methods. It was decided to use the thermocouple technique supplemented by radiographic and macro examinations. It was also suggested that dye be used in water poured into lucite molds to indicate when the last metal enters the mold.

Other discussions were held on the shape of castings, pattern equipment, and alloys for the research program.

afs chapter meetings

OCTOBER

OCTOBER

Birmingham District . . Oct. 11 . . Thomas Jefferson Hotel, Birmingham, Ala. . . T. E. Eagan, Cooper-Bessemer Corp., *"Nodular Iron."*

British Columbia . . Oct. 18-19 . . *See Northwest Regional Conference.*

Canton District . . Oct. 3 . . Swiss Club, Canton, Ohio . . H. H. Kessler, Sorbo-Mat Process Engineers, *"Gating & Risering."*

Central Illinois . . Oct. 7 . . American Legion Hall, Peoria, Ill. . . R. LeMaster, R. A. Nelson Pattern Co., *"The Use of Plastics for Patterns,"* and R. Olson, Southern Precision Pattern Works, Inc., *"Engineering a Pattern." Panel Discussion on Patterns.*

Central Indiana . . Oct. 7 . . Athenaeum Turners, Indianapolis . . J. A. Gitzen, Delta Oil Products Co., *"Mold & Core Sand Additives."*

Central Michigan . . Oct. 16 . . Hart Hotel, Battle Creek, Mich. . . Dr. C. A. Nagler, Wayne University, *"Heat Treatment of Cast Irons."*

Central New York . . Oct. 11 . . Mark Twain Hotel, Elmira, N.Y. . . Z. Madacey, Beardsley & Piper Div., Pettibone Mulliken Corp., *"Coremaking, Shooting and Blowing."*

Central Ohio . . Oct. 14 . . Seneca Hotel, Columbus, Ohio . . C. E. Drury, Central Foundry Div., GMC, *"Gating to Control Pouring & Its Effect on Castings."*

Chesapeake . . Oct. 25 . . Engineers' Club, Baltimore, Md. . . D. J. Henry, Research Lab. Div., GMC, *"Foundry's Need of Tomorrow's Automobile."*

afs chapter meetings

Chicago . . Oct. 7 . . Chicago Bar Association, Chicago . . G. DiSylvestro, Burnside Steel Foundry Co., *"You Were There"* and F. G. Steinebach, Penton Publishing Co., *"Can We Sell More Castings?"*

Cincinnati District . . Oct. 14 . . Elks Temple, Hamilton, Ohio . . C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., *"Mechanization in the Small Foundry."*

Connecticut . . Oct. 29 . . Waverly Inn, Cheshire, Conn. . . D. E. Krause, Gray Iron Research Institute, *"Modern Cupola Practice."*

Corn Belt . . Oct. 11 . . Cotner Terrace Cafe, Lincoln, Neb. . · W. A. Hambley, Charles A. Krause Milling Co., *"Casting Defects."*

Detroit . . Oct. 17 . . Tuller Hotel, Detroit. . . W. H. Dawson, Kelsey-Hayes Wheel Co., *"Cupola Melting."*

Eastern Canada . . Oct. 4 . . Sheraton Mt. Royal, Montreal . . R. B. Hill, Canada Iron Foundries Ltd., *"Profit Management Through Cost Control."*

Eastern New York . . Oct. 15 . . Panetta's Restaurant, Menands, N. Y.

Metropolitan . . Oct. 7 . . Essex House, Newark, N. J. . . M. K. Young, United States Gypsum Co., *"New Opportunities for the Pattern Industry."*

Mexico City . . Oct. 7 . . Mexico D. F., **Mexico . . Oct. 7 . .** Mexico D. F., Mexico · . C. Adovasio, Cia Fundidora Del Norte, S. A., *"Malleable Castings."*

Michiana . . Oct. 14 . . Tosi's, St. Joseph, Mich. . . H. J. Weber, AFS, *"Legislation Affecting Foundries."*

Michigan Regional Foundry Conference . . Oct. 2-3 . . Kellogg Center, Michigan State University, East Lansing, Mich. *Sponsored by Central Michigan, Detroit, Saginaw Valley and Western Michigan Chapters of AFS, Michigan State University and University of Michigan Student Chapters.*

Mid-South . . Oct. 11 . . Claridge Hotel, Memphis, Tenn. . . F. B. Eiseman, Woodward Iron Co., *"Chemistry & Mechanics of Iron Ore to Pig."*

Mo-Kan . . Oct. 4 . . Fairfax Airport, Kansas City, Kans. . . H. J. Weber, AFS, *"Legislation Affecting oFundries."*

New England . . *See New England Regional Foundry Conference.*

New England Regional Foundry Conference . . Oct. 18-19 . . Massachusetts Institute of Technology, Cambridge, Mass. *Sponsored by New England and Connecticut Chapters of AFS.*

Niagara Frontier Regional Foundry Con-

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casting through the ages

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ference . . Oct. 24-25 . . Hotel Statler, Buffalo, N.Y. *Sponsored by Western New York, Central New York, Eastern New York, Northwestern Pennsylvania, Ontario and Rochester Chapters of AFS.*

Northeastern Ohio . . Oct. 10 . . Tudor Arms Hotel, Cleveland . . H. E. Henderson, Lynchburg Foundry Co., *"The Externally Water-Cooled Cupola."*

Northern California . . Oct. 14 . . Spenger's, Berkeley, Calif. . . Local Panel, *"Shell Molding."*

Northern Illinois & Southern Wisconsin . . Oct. 8 . . LaFayette Hotel, Rockford, Ill. . . A. J. Paul, Caterpillar Tractor Co., *"Castings from the Buyer's Viewpoint."*

Northwest Regional Foundry Conference . . Oct. 18-19 . . Hotel Vancouver, Vancouver, B.C. *Sponsored by Oregon, Washington and British Columbia Chapters of AFS and Oregon State College Student Chapter.*

Northwestern Pennsylvania . . Oct. 28 . . Amity Inn, Erie, Pa. . . *"Epoxy Resin Patterns."*

Ontario . . Oct. 25 . . Royal York Hotel, Toronto, Ontario . . R. W. Ruddle, Foundry Services, Inc., *"Non-Ferrous Melting & Its Effect on Casting Quality,"* A. Kavosi, Jr., Auto Specialties Mfg. Co. (Canada) Ltd., *"Cracking in Malleable Iron Castings,"* and A. P. Alexander, International Harvester Corp., *"Slag Control in Cupola Melting."*

Oregon . . *See Northwest Regional Foundry Conference.*

Philadelphia . . Oct. 11 . . Engineers' Club, Philadelphia. . . H. F. Taylor, Massachusetts Institute of Technology, *"Food for Thought."*

Piedmont . . *No Meeting.*

Pittsburgh . . Oct. 21 . . Hotel Webster Hall, Pittsburgh, Pa. . . C. E. Coulter, Archer-Daniels-Midland Co., *"Which Core Process."*

10th Annual Purdue Metals Casting Conference . . Oct. 31-Nov. 1 . . Purdue University, Lafayette, Ind. *Sponsored by Central Indiana and Michiana Chapters of AFS and Purdue University.*

Quad City . . Oct. 21 . . Fort Armstrong Hotel, Rock Island, Ill. . . W. R. Jennings, John Deere Waterloo Works, *"Two Decades in Foundry and Manufacturing."*

Rochester . . Oct. 1 . . Hotel Seneca, Rochester, N.Y. . . P. V. Lovette, Jr., Corning Glass Works, *"Glascast."*

Saginaw Valley . . Oct. 10 . . Fischer's Hotel, Frankenmuth, Mich. . . R. F. Thompson, Metallurgical Rsch. Dept. GMC, *"Planning for 20th Century Foundry."*

St. Louis District . . Oct. 10 . . Edmond's Restaurant, St. Louis.

Southern California . . Oct. 11 . . Rodger Young Auditorium, Los Angeles . . R. Silva, Fairbanks, Morse & Co., *"Cold Set Cores."*

Tennessee . . Oct. 18 . . Patten Hotel, Chattanooga, Tenn. . . F. M. Scaggs, Oklahoma Steel Castings Co., Inc., *"Coremaking With CO_2 Process."*

Texas . . Oct. 18 . . Menger Hotel, San Antonio, Texas . . H. von Wolf, Shalco Engineering Corp., *"Development of Shell Core Process."*

Texas, San Antonio Section . . *See Texas Chapter.*

Timberline . . Oct. 14 . . Oxford Hotel, Denver, Colo. . . W. A. Hambley, Charles A. Krause Milling Co., *"Casting Defects."*

Toledo . . Oct. 2 . . Heather Downs Country Club, Toledo, Ohio. . . R. W. Gardner, Dearborn Iron Foundry, Ford Motor Co., *"Quality Control in the Foundry."*

Tri-State . . Oct. 18 . . Wilder's Cafe, Joplin, Mo. . . H. Bishop, Exomet, Inc., *"Heat Transfer as Applied to Castings."*

Twin City . . Oct. 8 . . Jax Restaurant, Minneapolis . . W. Ball, Jr., R. Lavin & Sons, Inc., *"Human Engineering." Meeting to emphasize work of educational committee; students invited.*

Utah . . Oct. 23 . . Parks Cafe, Orem, Utah . . T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemicals Corp., *"Castings Defects."*

Washington . . *See Northwest Regional Foundry Conference.*

Western Michigan . . Oct. 7 . . Bill Stern's Steak House, Muskegon, Mich. . . *Plant Visitation,* Misco Precision Casting Co.

Western New York . . Oct. 4 . . Sheraton Hotel, Buffalo, N.Y. . . E. Harris, *"Experiences in Sub-Artic Region."*

Wisconsin . . Oct. 11 . . Schroeder Hotel, Milwaukee . . R. L. Gilmore, Superior Steel & Malleable Castings Co., *"Advantages of Proper Casting Design."*

NOVEMBER

Central Illinois . . Nov. 4 . . American Legion Hall, Peoria, Ill. . . W. L. Nauman, Caterpillar Tractor Co. *University of Illinois Student Chapter Night.*

Chicago . . Nov. 4 . . Chicago Bar Association, Chicago . . *Division Meeting; Student Night; Robert E. Kennedy Scholarship Award.* Gray Iron Group: B. G. Gray, Air Reduction Co., Inc., *"Altering Properties & Structure of Cast Iron by Injection Method;"* Malleable, Steel Group: M. F. Surls, Charles C. Kawin Co., *"Advanced, Rapid, Metallurgical Analysis by Instrumentation;"* Management, Maintenance Group: E. E. Schulze, Stevenson, Conaghan, Velde & Hackbert, *"New Chicago Smoke Ordinance;"* Pattern, Non-Ferrous Group: A. B. DeRoss, Kaiser Aluminum & Chemical Sales, Inc., *"Casting Aluminum Alloys."*

Metropolitan . . Nov. 4 . . Essex House, Newark, N. J. . . H. H. Kessler, Sorbo-Mat Process Engineers, *"Gating & Risering."*

Mo-Kan . . Nov. 1 . . Fairfax Airport, Kansas City, Kans.

Piedmont . . Nov. 1 . . Hotel Charlotte, Charlotte, N. C. . . J. A. Gitzen, Delta Oil Products Co., *"Cores and Core Washes."*

Western New York . . Nov. 1 . . Sheraton Hotel, Buffalo, N. Y.

Mid-South . . Nov. 8 . . Claridge Hotel, Memphis, Tenn.

Wisconsin . . Nov. 8 . . Schroeder Hotel Milwaukee.

F.E.M.A. to Hear Shipley

■ Frank W. Shipley, former president of the American Foundrymen's Society, will be the guest speaker at the 39th annual meeting of the Foundry Equipment Manufacturers Association to be held October 17-19 at the Greenbrier Hotel, White Sulphur Springs, W. Va.

Mr. Shipley, foundry manager, Caterpillar Tractor Co., Peoria, Ill., will discuss *"What Foundry Management Expects of the Foundry Equipment Industry."*

Sulphur-Removal Technique May Benefit Ductile Iron

■ Production of ductile cast iron may be aided by the development of a continuous sulphur-removal process developed by Battelle Memorial Institute, Columbus, Ohio.

With this technique, molten iron and caustic soda are fed continuously into an apparatus where desulphurization occurs as the materials are intermixed. Desulphurization metal and caustic slag flow continuously from the apparatus into molds or ladles.

Introduction of a jet of oxygen into the mixing chamber makes it possible to remove substantial amounts of silicon at the same time the sulphur content is being reduced.

Under laboratory conditions, the process has been used to achieve 90 per cent reductions in sulphur content.

Desulphurization occurs rapidly because thin layers of reacting materials are used. Samples taken during heats at Battelle's pilot-plant laboratory show that the sulphur-removal reactions after addition of the caustic soda require less than a minute for completion. Large quantities of iron can be treated in a unit requiring relatively small space.

the SHAPE of things

safety, hygiene, air pollution

by HERBERT J. WEBER

SH&APe FACTS & FALLACIES

Score Yourself: Are they true or false?

Anyone sending in the first correct set of answers will receive free a copy of our ENGINEERING MANUAL FOR CONTROL OF IN-PLANT ENVIRONMENT IN FOUNDRIES. (Regular member price $6.00). Four books will be given away, one to the winner in each of the four time zones. Priority will be based on the date and time shown on the postmark. No need for special delivery or airmail.

Indicate your answers on the card shown between pages ? and ?. Tear out and mail to me at MODRN CASTINGS.

1) Vibrating tools such as pneumatic chisels, rams and grinders, can cause a disease known as white fingers . . . . and it's compensable in some states.
2) Bentonite causes tuberculosis.
3) If you spit black, the dust you are breathing is dangerous.
4) A thermometer is a good instrument to determine the heat load on a foundry worker.
5) Silica causes silicosis because its effect on the lung is (a) mechanical (b) chemical (c) electrical (Piezoelectric effect).
6) Water glass used in the CO_2 process is a hazard because it is a silicate.
7) In a dusty operation, dust particles larger than 5 microns may be ignored insofar as their effect on health is concerned.
8) A squirrel-cage fan running backwards will not reverse the air flow in an exhaust system.
9) If one inhales excessive amounts of lead fume, the excess can be detected in the blood.
10) If one inhales excessive amounts of iron fumes, the excess cannot be detected in the blood.
11) 1956 was the first year of record that the accident frequency rate for foundries fell below the national average for all industry.
12) The greatest number of accidents in foundries are due to unsafe conditions.
13) The principal reason for exhaust ventilation in a modern sand blast room is to maintain visibility.
14) Daily inhalation doses of aluminum dust constitute the best method of preventing silicosis.
15) Carbon tetrachloride is suitable for extinguishing electrical fires.

The numbers circled below refer to true statements					The numbers circled below refer to false statements				
1	2	3	4		1	2	3	4	
6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15

The correct answer to statement 5 is

A ( ) B ( ) C ( )

Check one

Name_____ **Title**_____

Company_____

Address_____

City_____ **Zone**_____ **State**_____

FOUNDRY FACTS NOTEBOOK

Introduction to the Cupola

MODERN CASTINGS *brings to you in this issue a new feature,* FOUNDRY FACTS NOTEBOOK*—designed to bring you practical down-to-earth information about a variety of basic foundry operations. As the name implies, this page is prepared for easy removal and insertion into a notebook for handy future reference.—Editor*

The cupola is fundamentally the most important unit in the equipment of gray and malleable iron foundries. This unit is fed air, coke, limestone, and solid metal and delivers molten iron suitable for pouring into molds.

The cupola is a vertical shaft-type furnace, consisting of a cylindrical steel shell lined with refractory materials and equipped with a windbox and tuyeres for the admission of air. A charging opening is provided at an upper level for the introduction of melting stock and fuel. Near the bottom are tap holes for the removal of molten metal and slag.

The quality of metal running out of the tap hole depends on the raw materials charged and the way the cupola is operated. *The primary objective in cupola operation is to produce iron of the desired composition and temperature at a definite rate in the most economical manner.*

Cupola Shell

Figure 1 is a simplified diagram showing the essential parts of a cupola. The cupola stack or shell is a steel casing to contain and support the refractory lining, wind and tuyere boxes, tuyeres, roof hood and spark arrester.

The shell consists of heavy steel plates rolled into cylindrical sections, and riveted, bolted or welded together with downward-lapping joints for protection against weather. Stack top is reinforced with an angle iron ring, riveted onto the shell in such a manner as to afford protection against rain seepage between lining and shell. The lower or body section is substantially built to support the load of the upper sections. "Shelf segments" are bolted to the inside of shell at regularly spaced intervals for supporting the refractory lining.

The cupola stack extends through the foundry roof with sufficient height to comply with local fire codes, usually a minimum of 10 ft above the roof or adjoining peaks. It is sometimes carried further to provide more natural draft at the charging opening, or to provide additional space to permit complete combustion of the gases above the charged column.

Space is provided between the stack and roof for fire protection. The top of stack may have a spark arrester—a double-cone device of perforated steel for reducing fire hazard of sparks in effluent gases.

Local smoke ordinances in many locales have required foundries to equip cupolas with special equipment to remove fly ash and fumes from stack gases.

Lower Construction

A suitable concrete foundation for the cupola should be provided. The top of foundation should be kept 6 in. below foundry floor level, allowing for fill with sand or other heat insulating material for protection of the concrete footing.

The bottom plate is heavy steel substantially reinforced with beams, angles and gussett plates. A circular hole is cut out of center to conform with inside diameter of the refractory lining. Four tubular steel legs filled with reinforced concrete support the cupola on its concrete foundation.

Two semicircular drop-bottom doors are hinged to the bottom plate (Fig. 2). Doors are heavily ribbed cast iron perforated to per-

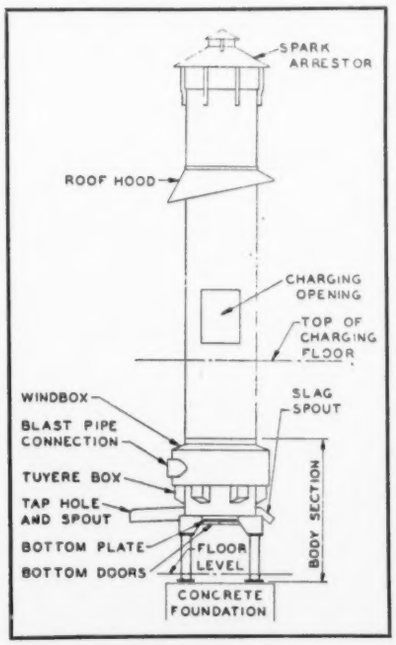


Fig. 1 . . Essential parts of conventional-type cupola.

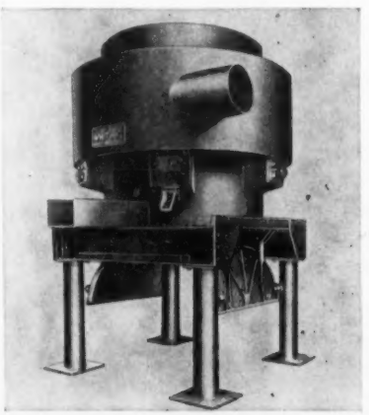


Fig. 2 . . Drop-bottom doors are made of ribbed-cast iron.

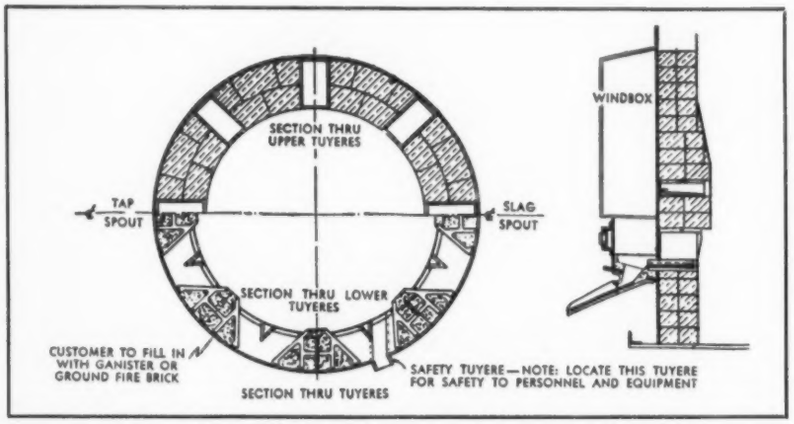


Fig. 3 . . Sectional view of tuyeres of conventional cupola.

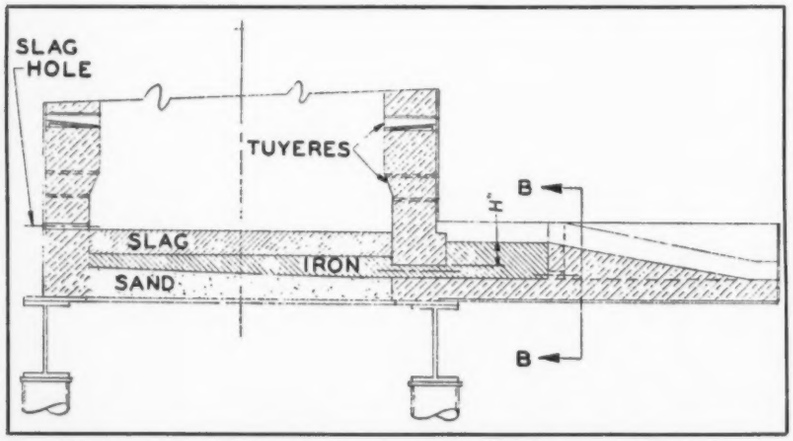


Fig. 4 . . Rear slagging hole is located higher than metal tap hole.

mit escape of gases. Steel bars are used to prop the doors when closed.

The lower section of cupola stack is welded inside and out to the bottom plate. To this section the windbox, slag and tap spouts, and tuyere boxes are attached. Bottom level of windbox is above tuyere level.

Tuyeres

Tuyere boxes connect windbox to tuyere openings in shell. Large peep and hand holes are provided in each box. Tight-fitting covers are equipped with locking devices that permit quick opening and closing.

Tuyeres extend through the refractory lining and distribute the air blast uniformly in the coke bed (Fig. 3). Tuyeres are composed of cast-iron bottom plates, spacers, and cover plates. The plates are segments of a circle for easy handling. Cover plates have an outer and inner ring. The latter can be replaced without disturbing the outer ring and backup lining. Tuyeres are located at least 20 in. above cupola bottom plate to provide ample well capacity; also 4 to 6 in. above slag hole.

Cupola Well

The cupola well acts as a reservoir for the melted iron and slag. A tap hole is located in front of the cupola at the lowest point in the well. Molten metal and slag can be tapped continuously through this hole—a practice known as front-slagging. A dam in the spout diverts the slag from the top of the metal into a trough leading to a special slag container (Fig. 5).

Some cupolas have a hole in the back of well and above the level of tap hole. As the level of metal and slag rise in well, slag runs out the back-slagging hole (Fig. 4).

Charging

An opening is provided in the cupola for charging the coke, limestone, and metal. The sill of this charge opening is located anywhere from 15 to 25 ft above the bottom plate. This distance is known as the effective height of a cupola. The larger the cupola diameter the higher the charging door.

The charging opening provides a doorway through which raw materials are dropped into cupola. Although charging used to be done entirely by hand, practically all cupolas are charged today with mechanically conveyed drop-bottom buckets.

The information presented in "Foundry Facts Notebook" was excerpted from THE CUPOLA AND ITS OPERATION, published by the American Foundrymen's Society.

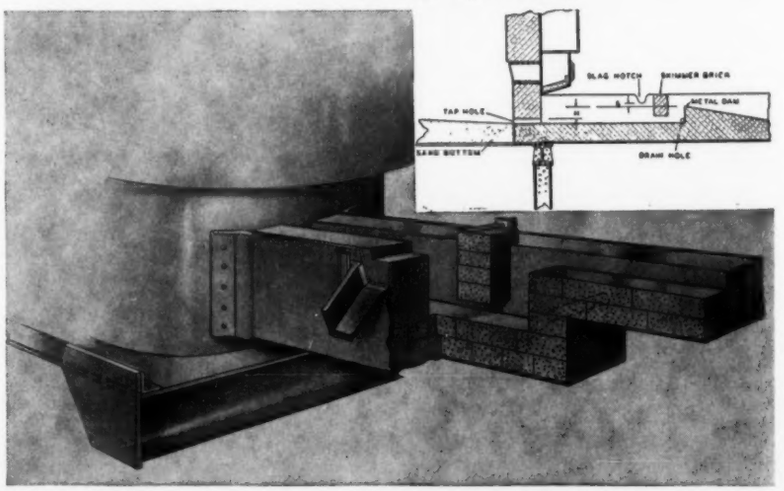


Fig. 5 . . Views of continuous front slagging spout on cupola.

Characteristics Affecting Control of Molding Sands

by FRANK YOUNGWORTH / *Sand Technician*
*Blaw-Knox Co., Foundry & Mill Div., Corapolis Works, Corapolis, Pa.**

■ It is the object of this paper to consider a few of the characteristics of molding sand which are important to sand control because of their influence on sand and ways and means by which they can be controlled.

The molds should be rammed as hard as present day equipment will permit since any increase in the hardness and density will improve both finish and dimensional accuracy.

Clean bins, with tight roofs for storage of sand and binders, are very desirable. Sand mills must be kept in good mechanical condition with regular check up and replacement of worn plows, bottoms, and mullers. Measuring devices are necessary for sand, binders, and water for the positive control of sand properties. As mulling time is important, the mulling time should be posted and a bell timer attached to the mill to make timing of the cycles simple. Experience has shown that frequent check ups are necessary to make certain that this equipment is used as intended.

The proper location for sand testing equipment is at the sand mills. The green property tests which are necessary, permeability, moisture, green strength, and weight of 2 in. speciman are very simple to perform and the mill operators can be trained to do this work. These tests can be made during the last minutes of the mulling cycle with no loss of production. If the mill operator is required to make these tests as often as is necessary to assure uniformity, it will make his work more interesting and he will take more interest in the final product. Uniformity of the sand mixes will be assured and the sand technician will have more time to devote to other duties.

In conclusion, I would like to repeat that as the cost and quality of green sand castings is greatly influenced by sand conditions in the foundry, close control of sand is necessary for efficient production. To achieve this, rigid control of sand standards and specifications for the mixes must be set up and operating procedures established which will make it possible to meet the specifications in a routine manner. With close control, the results on the castings can serve as a guide to the further modification of not only the sand mixes but also molding procedures and the choice of raw materials.

* This article is based on a talk given at the Penn State Foundry Conference June 20, 1957.

let's get personal

R. W. Schroeder . . has been elected vice-chairman of the AFS Education Division. Professor Schroeder is a member of the mechanical engineering department, University of Illinois, Navy Pier, Chicago.

L. A. Shea . . has been appointed eastern division manager for Lindberg Industrial Corp., Chicago. He has been associated with the Lindberg organization since 1937 and will now supervise activities through the divisional office at Fair Lawn, N.J.

Robert S. Knight . . has been named foundry manager of H. W. Knight and Son, Inc., Seneca Falls, N.Y. Mr. Knight recently completed studies in metallurgy at Cornell University.

Dr. David C. Ekey . . has been appointed professor of industrial engineering, Georgia Institute of Technology, Atlanta. Before this appointment he was director of research, Lebanon Steel Foundry, Lebanon, Pa. Dr. Ekey was an assistant professor of industrial engineering and head of the foundry option course, Pennsylvania State University, before he joined the Lebanon firm.

Ajax Electrothermic Corp. has named **A. D. Meyer** to succeed **Dr. G. H. Clamer** as general manager. Dr. Clamer continues as president of the firm. **W. J. Werts,** formerly purchasing agent and traffic manager, has been named plant manager.

Daniel R. Chester . . has been named manager for all core binder products for Archer-Daniels-Midland Foundry Products Div., Cleveland. Mr. Chester was formerly manager of technical services for the firm, and is a member of the AFS Sand Division Core Test Committee.

J. J. Wagner . . has been appointed sales representative for the grinding wheel division of Electro Refractories & Abrasives Corp. He will headquarter in Indianapolis.

Samuel Riker, Jr. . . has been elected secretary of New Jersey Zinc Co. He succeeds the late Walter R. Anyan.

R. W. Frank . . has been elected vice-president of Birdsboro Steel Foundry & Machine Co. Mr. Frank was formerly vice-president in charge of mill machinery sales for Blaw-Knox Co., Pittsburgh, Pa., and will act as a sales executive for Birdsboro Steel.

Two scientists have been named to posts at the Applied Research and Development Laboratory of General Electric Co.'s Foundry Department. **Karl D. Scheffer** has been named a development engineer for the lab. Mr. Scheffer was senior engineer in charge of developing the glascast process at Corning Glass Co. before joining General Electric Co. **Themistocles P. Floridis** has been named an applied research engineer. He was previously manager of product engineering at the GE Everett-Lynn Foundries.

D. C. Ekey

R. W. Frank

D. R. Chester

G. E. Drake . . has been appointed vice-president in charge of sales for Electro Metallurgical Co., Div. of Union Carbide Corp.

Dr. Floyd A. Van Atta, chairman of the AFS Radiation Protection Committee and a member of the AFS Safety, Hygiene and Air Pollution Control Program Steering Committee has resigned because of a change in employment. Dr. Van Atta is now associated with the U.A.W.-C.I.O. **A. H. Rose, Jr.,** chief of the engineering research and development section, Community Air Pollution Program of the U. S. Public Health Service has been appointed to the Steering Committee to replace Dr. Van Atta. **I. C. Roberts,** formerly vice-chairman of the Radiation Protection Committee has been elected to replace Dr. Van Atta as chairman of that group.

K. A. Lang . . has been appointed general manager of Lindberg Engineering Co.'s manufacturing plant at Downey, Calif. He will also be responsible for sales activities of Lindberg Engineering Co. and Lindberg Industrial Corp. in Downey, San Francisco, and Denver, Colo.

Dr. L. R. Fink . . has been appointed general manager of the X-Ray Department, General Electric Co., Milwaukee. Dr. Fink was formerly manager of research application at the General Electric Research Laboratory in Schenectady, N.Y.

Malcolm Petrie . . has joined W. Thomas Barr Associates, Birmingham, Ala. Mr. Petrie was formerly assistant sales manager of Shell Process Inc., West Springfield, Mass.

E. R. Kelly . . has been appointed to the newly created post of assistant manager of the advertising and sales promotion department of the Joseph Dixon Crucible Co., Jersey City, N.J.

T. C. Clawson . . has been named assistant sales manager of the Corn Products Sales Co. Chicago office.

D. K. Ballman . . former general sales manager of Dow Chemical Co. has been promoted to director of sales.

James Boerger . . has been promoted from foundry works manager of the International Harvester Co. Indianapolis plant to general manager of Harvester's Springfield, Ohio, plant. Mr. Boerger has been empolyed by the company since his graduation from the University of Wisconsin in 1947.

Henry C. Bray . . has joined Stoller Chemical Co., Akron, Ohio, as sales representative and technical advisor. Mr. Bray was formerly associated with Wauseon Foundry Co., Wauseon, Ohio.

Wayne R. Rawlings . . has joined Pettibone Mulliken Corp., Foundry Div., Chicago, as a metallurgist. He was formerly metallurgist for Bell & Howell Co., Chicago.

William H. Dawson . . has joined Kelsey-Hayes Wheel Co., Detroit, as assistant foundry superintendent. Mr. Dawson was formerly associated with Ford Motor Co.

Bernard J. Beierla . . has been named chief metallurgist for Springfield Foundry Co., Indian Orchard, Mass. Mr. Beierla has been associated with E. W. Bliss Co., Toledo, Ohio, for 17 years, most recently holding the post of foundry administrator and chief metallurgist.

Robert A. Breisch . . is now a castings and forgings engineer for Chrysler Corp., Detroit. Mr. Breisch was formerly a foundry engineer for Ford Motor Co.

R. D. Bradford . . vice-president and director of American Smelting and Refining Co., has been placed in charge of the company's Federated Metals Division. The company will be the world's largest producer of secondary aluminum alloy ingot when a plant now under construction at Alton, Ill., is completed.

Harold C. Erskine . . assistant general production manager for Aluminum Co. of America has been appointed general manager in charge of the company's smelting and fabricating operations. Before taking the post of assistant general manager, Mr. Erskine was general manager of firm's castings division.

C. B. Dewey . . has joined Giffels & Vallet, Inc., Detroit, as a foundry engineer. He was formerly an engineer for the Dearborn Iron Foundry, Ford Motor Co.

W. E. Guertler . . is now Philadelphia regional manager for Crouse-Hinds Co., Syracuse, N. Y.

obituaries

Mortimer R. Anstice, Sr., 71, died July 9 after a long illness. He was president of The Anstice Co., Inc., Rochester, N.Y., founded by his father in 1884.

A graduate of Yale University, Mr. Anstice was active in civic affairs and at the time of his death was president of the Reynolds Library Division of the Rochester Public Library. He was a past president and director of Rochester General Hospital and held memberships in the Genesee Valley Club, Rochester Yacht Club, Key Largo Anglers Club of Florida, and Rochester Chapter of AFS.

Joseph H. Bridge, 77, founder of the Maumee Pattern & Mfg. Co., Toledo, Ohio, died recently after an illness of five years. He founded the company in 1914 and was its president until his retirement in 1954.

Mr. Bridge was a member of AFS, East Toledo Club, Elks and Kiwanis,

J. H. Bridge

and was chairman of the Pattern Manufacturing Society of Toledo. He had been a resident of Toledo for fifty years.

Dr. Claude C. Van Nuys, retired chief physicist for Air Reduction Co., Inc., New York, died August 20. He was 79 years old. He joined Air Reduction in 1918 as an engineer and at the time of his retirement in 1949 was in charge of the Physics Section of the Research and Engineering Dept.

Dr. Irving Langmuir, 76, world-famous scientist and member of the staff of General Electric Research Laboratory, Schenectady, N.Y., from 1909 until his retirement in 1950, died suddenly August 16.

David E. Linn, 50, manager of sales service for Corn Products Sales Co., New York, died August 6 of coronary thrombosis.

A graduate of Pomona College in California, Mr. Linn joined Corn Products as a trainee at Argo, Ill. in 1930, served as assistant to research director at Edgewater, N.J., became assistant manager of the sales service department in 1939 and was named manager of the department in 1956. He was a member of the Metropolitan Chapter of AFS and American Chemical Society.

Charles R. Holzworth, 70, retired president of Tonawanda Iron Div., American Radiator & Standard Sanitary Corp., died August 19. He was also president of the American Allsafe Co., vice-president of Sterilon Corp. and a director of DuBois Plastic Products Co. He was a graduate in metallurgical engineering, Carnegie Institute of Technology, a member of AFS and the American Iron & Steel Institute.

Harold H. Johnson, 56, director of research for National Malleable & Steel Castings Co., Cleveland, died August 22. He had been ill for about a year.

Mr. Johnson was a nationally-known research leader in the foundry

H. H. Johnson

industry and was especially in demand as a speaker on quality control.

A native of Brazil, Ind., he graduated from Rose Polytechnic Institute with a degree in mechanical engineering in 1923 and earned his M.S. in chemical engineering in 1928. He was associated with National Malleable for 34 years.

Mr. Johnson served on the executive committees of the steel and educational divisions of AFS for many years.

He was also a member of the American Society of Mechanical Engineers, American Society for Metals, American Society for Quality Control, Malleable Founders' Society, Steel Founders' Society of America, and Tau Beta Pi, honorary engineering fraternity.

Bert J. Barrell, general plant manger, Grinnell Corp., Providence, R. I. died August 14. He had been associated with the company thirty-five years.

Fred J. Coulton, secretary and treasurer of City Pattern Foundry & Machine Co., Detroit, died August 11 at Fort Lauderdale, Fla.

He organized the company in 1913, then known as City Pattern Works, and was secretary-treasurer until his death at the age of sixty-eight.

Benjamin Dodge, sales promotion manager, Iron Lung Ventilator Co., Cleveland, died recently.

Walter C. Samuels, representative, The S. Obermayer Co., Pittsburgh, Pa., died August 13.

foundry trade news

East Akron Casting Co. . . has moved into a new plant at Tallmadge, Ohio. The new foundry was engineered for jobbing production of gray iron and high strength alloy iron machine tool castings; 63 men are employed and the foundry is pouring 15 tons daily. R. W. Wenk is president of the firm, R. H. Wenk is production manager, K. S. Gay is general superintendent, and William Bulgrin is production superintendent.

Virginia Metalcrafters Inc. . . has purchased a plant at Waynesboro, Va., and will consolidate its brass and iron foundries with its Baltimore subsidiary, the Harvin Co., at the new location. The firm makes cast metal gift items, lighting fixtures, furniture, stoves, building supplies, and job castings.

Dominion Brake Shoe Co., Ltd. . . has acquired all physical assets and business of Manitoba Foundries and Steel, Ltd., Winnipeg. A. C. Montgomery will continue as manager of the plant which becomes the sixth division of Dominion Brake Shoe. Dominion Brake Shoe is a subsidiary of the American Brake Shoe Co.

Birdsboro Steel Foundry & Machine Co. . . Birdsboro, Pa., firm has announced net earnings of $376,237 for the first six months of this year compared with $383,119 for the same period a year ago.

Meehanite Metal Corp. . . has announced the licensing of three foundries to produce Meehanite castings. The three firms are: Casting Service Corp., La Porte, Ind.; Empire Foundry Co., Bonham, Texas; Byron Jackson Div., Borg-Warner Corp., Lawrenceburg, Ind.

Ohio Piston & Machining Co. . . is new name for Cleveland firm formerly known as Ohio Piston Co. Name change results from diversification of firm into specialized machining.

Fuller Co. . . pneumatic handling equipment producer has entered the field of dust collection by the purchase of Dracco Corp., Cleveland.

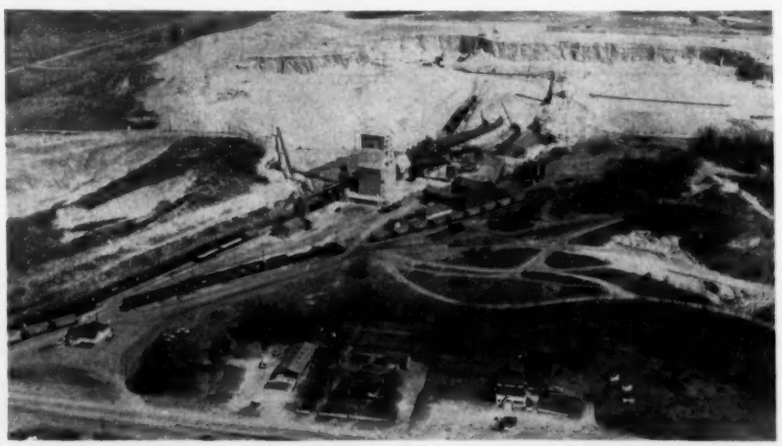
Harbison-Walker Refractories Co. . . has begun construction of an integrated research center in suburban Pittsburgh. Research work to be conducted in the new lab will include studies of investment materials for shell molding and precision casting.

Watertown Arsenal . . has installed a 500-lb capacity vacuum melting furnace to aid investigations of titanium and other reactive metals at the Gen. T. J. Rodman Laboratory, Watertown, Mass.

Mercast (Great Britain) Ltd. . . has issued its first license for production of castings by the Mercast process.

From hand shovel to power shovels, from horse-drawn wagons to lines of box cars, from local to national operations outlines the 50 years growth of Manley Sand Co., Rockton, Ill. The business was started originally as Rockton Moulding Sand Co. in 1907 by Edward B. Manley and an associate. Sales originally were confined to the northern-Illinois southern-Wisconsin area. To speed production power shovels and a narrow gauge railroad (above) were added. A milling and screening process were developed.

Since that time the company has continually expanded with members of the Manley family continuing as principals. Today, Manley Sand Co. and its affiliated Portage-Manley Sand Co. operate plants and maintain reserves at Portage, Wis. (below), Festus, Mo., Sawyer and Bridgman, Mich., and Michigan City and Dune Park, Ind. Recently National Silica Sand Co., Oregon, Ill. was acquired. William D. Chadwick, a partner in Manley Sand Co. and treasurer of Portage-Manley Sand Co., is active in affairs of the American Foundrymen's Society, currently serving as a member of the Grading, Fineness & Distribution Committee of the Sand Division.



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For Sale, Help Wanted, Personals, Engineering Service, etc., set solid . . 25c per word, 30 words ($7.50) minimum, prepaid.

Positions Wanted . . 10c per word, 30 words ($3.00) minimum, prepaid. Box number, care of **Modern Castings,** counts as 10 additional words.

Display Classified . . Based on per-column width, per inch . . 1-time, $18.00; 6-time, $16.50 per insertion; 12-time, $15.00 per insertion; prepaid.

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Foundry selling large Gray Iron Castings, needs the services of a Sales Engineer who has some college engineering and is capable of reading blue prints. We are looking for a man who is between 25 to 40 years of age and who is willing to work in the Chicago area. You may send your resume to: **C. N. Outman, HANSELL-ELCOCK CO., 485 West 23rd Place, Chicago 16, Illinois.** Telephone contact regarding this position can be made by calling **BIshop 7-4321.**

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FOUNDRY GENERAL FOREMAN desires position with progressive firm. Wide experience in gray iron castings up to thirty tons. Will send resume on request. Employed at present. **Box D-76, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

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MOLDING MACHINE: Herman 6000# capacity, jolt-roll-draw in operating condition. asking $$2,900.00 FOB Pottstown Machine Co., Pottstown, Pa. (Phone 37, H. H. Houston)

FOUNDRY FOR SALE

Fully equipped gray iron foundry, 17,000 square feet, ideally located in New York Metropolitan Area, 2 acres of land, R.R. Siding.

Fully equipped 16-ton cupola, American Wheelabrator, core ovens, jolt squeezers, etc., etc. Write:

J. J. MESSER
6 EAST 39TH STREET
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or phone **MURRAY HILL 9-5765**

PRICED FOR IMMEDIATE SALE, two Jeffrey Vibrators, Type 4, 440 Volts, 60 Cycle, 8 Amp. Reply: **LARO COAL & IRON COMPANY, P.O. Box 450, Flint, Michigan. Telephone SUnset 9-9186.**

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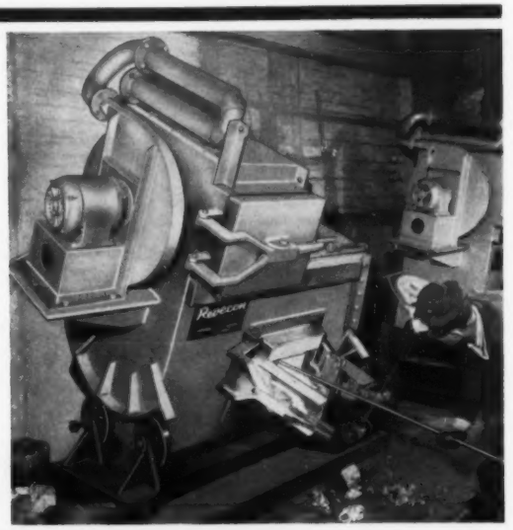

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British Iron and Steel Group to Meet in Europe

A special meeting of the Iron and Steel Institute, London, England, will be held in Belgium and Luxemburg June 18-28, 1958. Technical societies of these countries are organizing an international iron and steel meeting on the general theme of "New Developments in Iron and Steel Making."

The program will include technical sessions, plant visits, and social functions. Papers will be presented on recent developments in the United States, Canada, as well as British, Scandinavian, and European techniques.